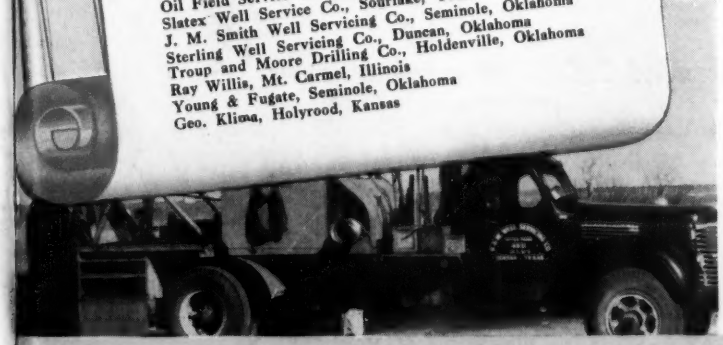
the OIL AND GAS JOURNAL

HONOR ROLL OF A FEW OWNERS OF FRANKS WELL SERVICING UNITS

M. V. Barrett, Freer, Texas
Jesse Durossette, Haskell, Oklahoma
Falco Oil Well Service Co., Alice, Texas
Foster & Abplanalp, Winfield, Kansas
Gleason Drilling Co., Russell, Kansas
Got Well Servicing Co., Houston
N. L. Gregg, Winnett, Montana
Jim Hughes, Sperry, Oklahoma
L. C. Irwin, Harden City, Oklahoma
Johns Brothers Well Servicing Co., Bristow, Oklahoma
K. B. Knox Drilling Co., Houston
Albright Well Servicing Co., Hobbs, N. M.
Bates and Cornell, Lafayette, Louisiana
Big State Well Service Co., Levelland, Texas
Carley Well Servicing Co., Borger, Texas
Ralph Clarke, Hobbs, N. M.
Carnahan Well Service Co., Bristow, Oklahoma
Carey Brothers Well Servicing Co., Freer, Texas
Armour Well Service, Lyons, Kansas
Bateman & Whitsitt, Hobbs, N. M.
C. R. Colpitt, Tulsa
Roy Colvin, Snomac, Oklahoma
Colvin Well Servicing Co., Seminole, Oklahoma
Lawrence Mathews & Son, Eldorado, Kansas
Rufus Clark Well Service Co., St. Louis, Oklahoma
K. D. Emrick, Seminole, Oklahoma
G. & W. Well Service Co., Odessa, Texas
James Well Service Co., Hobbs, New Mexico
Brownie's Well Servicing Co., Andrews, Texas
C. B. Furney Oil Well Service Co., Abilene, Texas
Jones Well Servicing Co., Guthrie, Oklahoma
Kennedy & Booth, St. Louis, Oklahoma
Shebester-Toland & Reeves, Pauls Valley, Oklahoma
Smith & Phillips Well Servicing Co., Cyril, Oklahoma
Standard Well Servicing Co., Oklahoma City
M & R Specialty Co., Houston, Texas
Ralph Johnson Rig Co., Hobbs, New Mexico
Miller Well Service Co., Gridley, Kansas
Prairie Oil Well Drilling Co., Russell, Kansas
Scott's Well Service Company, Seminole, Oklahoma
Seminole Well Servicing Co., Seminole, Oklahoma
J. P. Gibbins, Midland, Texas
Gillman Well Servicing Co., Ulysses, Kansas
Harrold Brothers Well Servicing Co., Edmond, Oklahoma
Charles Hinson, Centralia, Illinois
Geo. Hughes, Coweta, Oklahoma
Keoughan Brothers Well Servicing Co., Fairfield, Illinois
Mizel & Randel, Carlsbad, N. M.
Morrison Drilling Co., Eldorado, Kansas
Mumy Well Service Co., Reed City, Michigan
Oil Field Service Co., Artesia, N. M.
Slatex Well Service Co., Sourlake, Texas
J. M. Smith Well Servicing Co., Seminole, Oklahoma
Sterling Well Servicing Co., Duncan, Oklahoma
Troup and Moore Drilling Co., Holdenville, Oklahoma
Ray Willis, Mt. Carmel, Illinois
Young & Fugate, Seminole, Oklahoma
Geo. Klima, Holyrood, Kansas



Ask

THE CONTRACTORS WHO OWN FRANKS SERVICING UNITS...

1. If Franks units are not the most economical for their customers.
2. If Franks units are not busier than other units they own.
3. If their customers do not most of the time request that Franks units be used.
4. If Franks units do not require less down time, due to Franks extensive field service.

There must be a reason when companies pay contractors more per hour for using Franks servicing units and will wait for them even when other makes are immediately available. It will pay you to investigate Franks. Call a stock distributor, see a Franks representative, or write Franks Manufacturing Corp., Box 3218, Tulsa, Oklahoma.

FRANKS UNITS NOW STOCKED BY:
Bovaird Supply Co.
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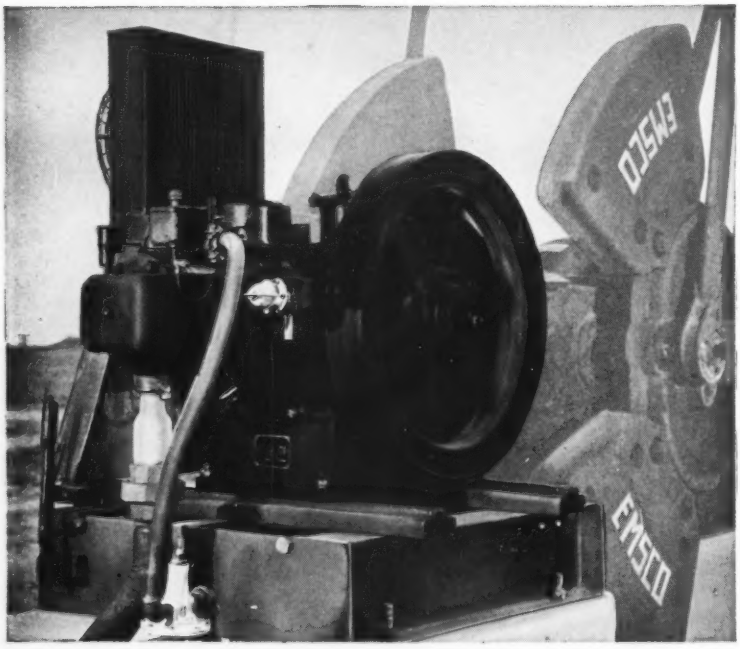
Jones and Laughlin Supply Co.

FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS
TULSA, OKLAHOMA

THE CSCO PUMPING ENGINE

. . . Designed For a Specific Purpose



TO PUMP OIL

The CSCO is not an adaptation of an engine originally created for another purpose. The CSCO line of Pumping Engines was designed without compromise to meet all pumping requirements . . . every element deliberately engineered by men long experienced in oil well pumping.

CSCO Pumping Engines have been operating for four years under every possible condition. Today's performance of those in service during that period justifies the judgment of designing a pumping engine for a *specific purpose.*

THE CSCO 96 - 66 - 46

Enclosed to conquer dirt . . . Pressure Lubricated to conquer wear . . . Steam Cooled to conquer heat and cold . . . Heavy Flywheel to conquer peak load.

Ask a Continental Man for complete details

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APR

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when you specify

Du Pont Gasoline Additives

You can simplify your refining problems by selecting all your gasoline additives from this complete Du Pont line. These additives have been proved by many years use in the field. They are compatible with each other and are of uniform high quality.

The Du Pont District Laboratory which serves your area is available to assist you in evaluating these additives in your fuel and to make the proper recommendations. Write the nearest district office for additional information on this complete line of gasoline additives.

. . . A complete line to meet every need

Tetraethyl Lead Compounds
. . . Motor Mix . . . Aviation Mix

Du Pont Tetraethyl Lead Compounds are backed by 25 years manufacturing experience. Friendly, cooperative assistance in the solution of problems involving the use of TEL are a part of the comprehensive services DuPont offers in connection with its TEL compounds.

Gasoline Antioxidants
Nos. 5, 6, 22

All gasolines do not have the same likes and dislikes when it comes to antioxidants. That is why Du Pont offers you three gasoline antioxidants, from which you can choose the one best suited to your gasoline.

Metal Deactivator

Copper, an unwelcome catalyst in fuels, is easily and economically controlled with Du Pont Metal Deactivator. In every case, overcoming the catalytic effect of the copper is more economical with Du Pont Metal Deactivator than an attempt at stabilization with antioxidants alone.

Gasoline Dyes
Red, Blue, Yellow, Orange

Du Pont Gasoline Dyes establish the identity of your fuels. Four colors are available and the uniformity of these colors is maintained by careful control. Through mixture of two or more, a wide range of shades can be obtained.

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

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Protected Power!

Fairbanks-Morse QZK Motors on your pumping rigs mean protected power. Falling particles, dripping liquids can't hurt this motor. Its one-piece cast frame of unique design completely protects the motor in any position. This positive protection and other great features . . . the exclusive indestructible copperspun rotor . . . efficient cross-flow ventilation . . . cartridge type ball bearing mountings . . . and measured lubrication are your assurance of better pumping performance. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS
SCALES • MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS
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XUM

There's a Macwhyte Rope that's the right rope for your equipment

All job-proved—a thousand and one wire ropes to choose from

For easy handling and longer service use PREformed Whyte Strand—it's internally lubricated.

Ask a Macwhyte representative to recommend the rope best suited for your equipment.

Macwhyte Wire Rope

MACWHYTE COMPANY

2916 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

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Our distributors and mill depots throughout the U. S. A. and other countries carry stocks for immediate delivery.

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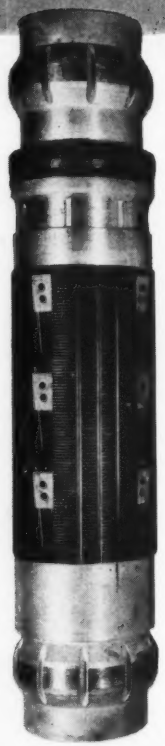
959

Announcing the new

O-C-T

TYPE DH-1
CASING HANGER
FOR
SUBSURFACE INSTALLATIONS



O-C-T Engineers, in cooperation with development engineers of a major oil company, have succeeded in designing this revolutionary means of putting casing weight down the hole . . . the oil industry's first off-shore casing hanger.

On off-shore and other water locations, the outer casing string is often ***unsupported*** for many feet with conventional hanger equipment . . . yet this long, slender, unsupported column is called on to support long, heavy, inner strings.

It is an accepted engineering fact that columns of high slenderness ratio ($\frac{l}{r}$) buckle readily under load. A conventional casing head used at the surface of the water puts all the weight of the inner strings on the outer string, which load added to natural forces from waves, wind and corrosion creates a dangerous condition.

The new O-C-T DH-1 Casing Hanger puts the weight on the outer string at a point where solid formation supports it, eliminating the column load and also eliminating the chances of dropping the inner strings in case of accidents to surface equipment.

The O-C-T "Down-the-Hole" Casing Hanger is simple to set. Simply install it in the inner string at the point to be suspended, run it in and cement. After cement has set, adjust tension on inner string, pump between the strings and setting is automatic. ***No rotation is required at any time.***

Write today for complete prices, delivery and setting details on this revolutionary new O-C-T Casing Hanger that eliminates a common hazard in off-shore operations. Available in usual casing size combinations.

NOTE: LICENSED UNDER PATENT RIGHTS OF MAJOR OIL COMPANY.

Oil Center Tool Company

P. O. BOX 3091 HOUSTON, TEXAS

Export Representatives: Venezuela, Colombia, Peru, and Ecuador: Berry & Hall, Apartado No. 34, Maracaibo, Venezuela

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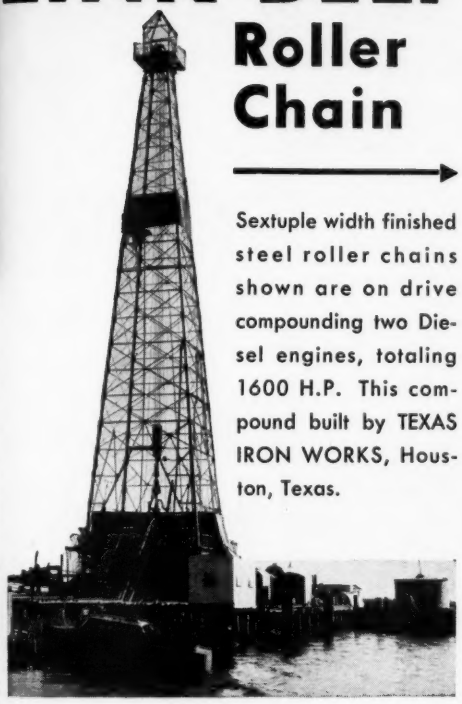
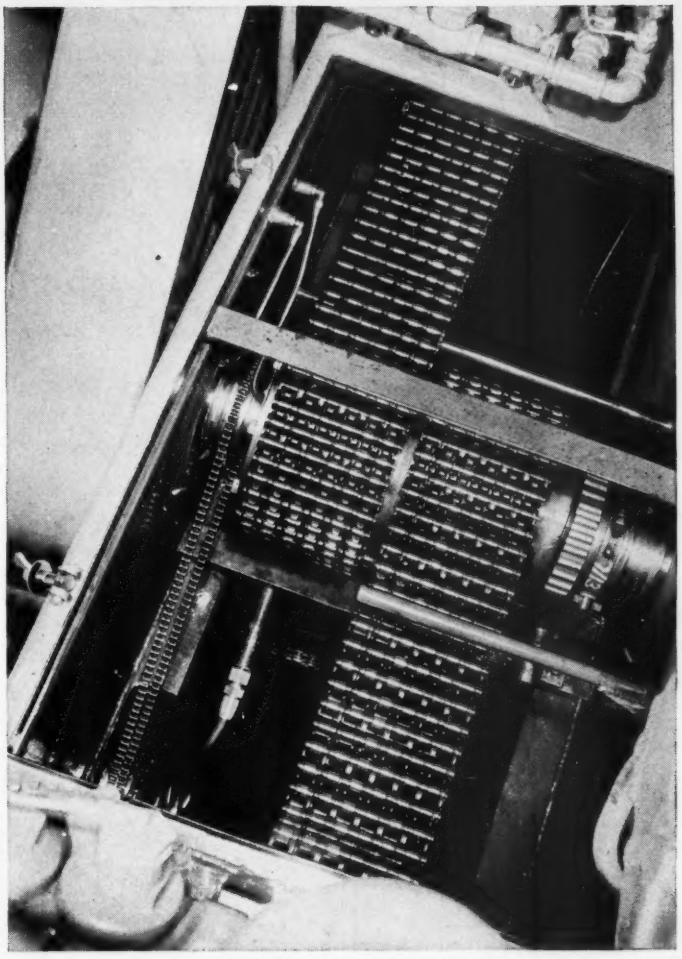
Harmony over Texas Tidelands . . . . . .

She's Powered Through

LINK-BELT Roller Chain



Sextuple width finished steel roller chains shown are on drive compounding two Diesel engines, totaling 1600 H.P. This compound built by TEXAS IRON WORKS, Houston, Texas.



Here's one of Otis W. Dyer, Jr.'s rigs, equipped with Link-Belt finished steel roller chain. It's drilling at 8021 feet, out in the isolated marshlands of the Texas Gulf Coast. Set on pilings, supplied only by a 13-mile boat trip, this is no place for costly breakdowns!

Mr. Dyer and his dad, old hands in a rugged business, say of Link-Belt roller chain, "None better", so when you want dependable performance from your drawworks, *always specify* Link-Belt roller chain.

> E-Z-ASSEMBLY <

Link-Belt Engineers have developed a construction that makes assembly and disassembly of multiple width chains in the field much easier. The press fits between chain pins and center sidebars have been eliminated, but load distribution across the width of the chain has been maintained.

LINK-BELT COMPANY Indianapolis 6, Dallas 1, Houston 2, Los Angeles 33, Kansas City 6, Mo., New York 7, Toronto 8.

11.393

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"Spark plug" to keep a high-speed business rolling—

The Beechcraft Bonanza

JOHN WRATHER
OIL OPERATOR
SOUTHWEST RESERVE LIFE BUILDING
LONGVIEW, TEXAS
TELEPHONE 4200

Mr. Walter H. Beech
Beech Aircraft Corporation
Wichita, Kansas, U.S.A.

Dear Mr. Beech:

We operate some 300 wells in Illinois, Indiana, Texas and Wyoming, and there is always something coming up that needs our attention at one or the other of these widely scattered operations.

Our Bonanza is an ideal solution to our problem, we have found. This way we're on the spot in a matter of hours, rather than the days required by other kinds of transportation. With this plane, I can suit my own convenience, and never worry about schedules. Recently, for instance, I had several days' business to complete in Los Angeles and Seattle. I left Longview, attended to my west coast affairs, and was vacationing at Miami on the east coast--all within a 10-day period.

Very truly yours,
John Wrather
John Wrather

Complete mobility of action is essential to *all* phases of the petroleum industry. But things can't move too fast for a Beechcraft Bonanza! This sturdy, versatile 4-place plane handles well in and out of the smallest fields, "pinch hits" as transportation for emergency equipment.

Investigate company ownership of this revolutionary plane. You'll find operating costs surprisingly low.

• A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Top speed, 184 mph
Cruising speed, 170 mph
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MODEL A35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

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great names...

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THE UNITED PUMPING UNIT
is a great name because of the substantial savings effected through its long life, and its maintenance-reducing engineered lubrication system. You're RIGHT when you specify the pumping unit labelled UNITED. And you're RIGHT when you purchase drilling-producing supplies through your nearest United store.
Uncle Sandy
THE UNITED SUPPLY MAN
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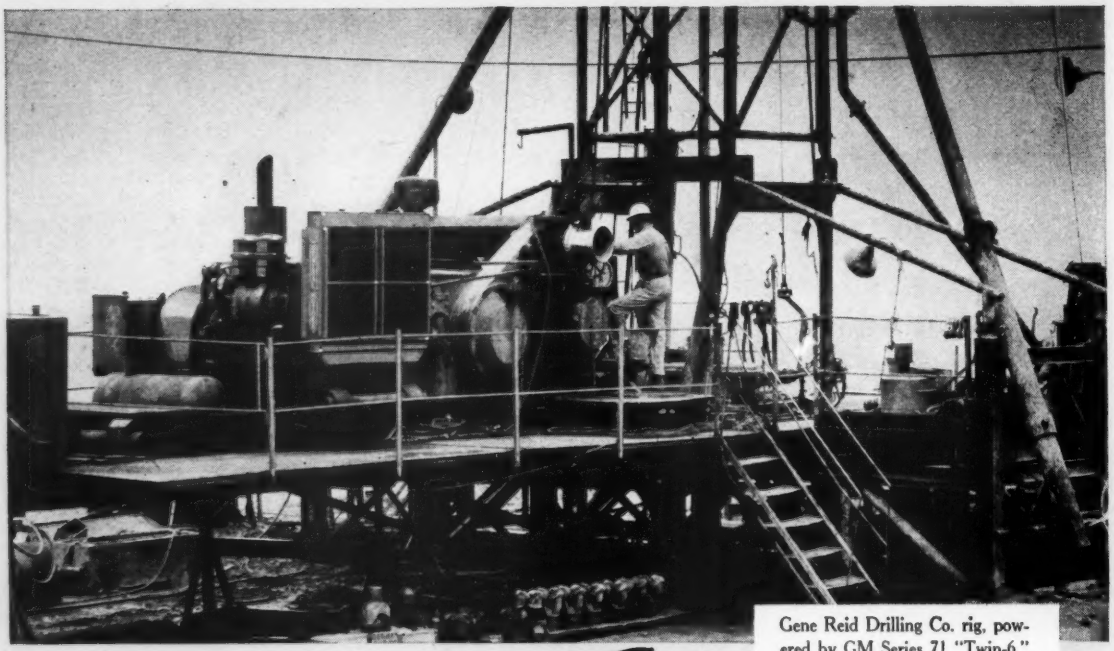

Gene Reid Drilling Co. rig, powered by GM Series 71 "Twin-6." The unit consists of a McCarthy-Bender 96′ mast and Emsco 936 draw works, drilling near Tejon Ranch, California.

Round Trip IN HALF THE TIME

YOU can take the word of D. E. Crandall, maintenance superintendent for Gene Reid Drilling Co., Bakersfield, California, that a General Motors Series 71 Diesel engine has no equal for fast, dependable performance in drilling service. He reports:

"Since November 1947 our rig has drilled seven wells, averaging 4000 feet each. With our GM Twin we make a round trip in half the time—it never stalls and not one cent has been spent in repairs. You just can't beat a GM engine for oil well drilling!"

Men who use them know—GM Series 71 Diesel engines deliver the rugged, flexible power required for oil-well drilling. Two-cycle operation—power at every downstroke—makes them unusually powerful for their compact size and weight. They pick up loads fast and respond instantly to varying power demands.

Simplified design makes maintenance an easy matter. Sensible size and weight make it easier to rig up and cut moving costs.

Before you buy new equipment or repower old units, it will pay you to get the facts about GM Diesel power. *Write, wire or phone for details.*

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES..Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS..Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

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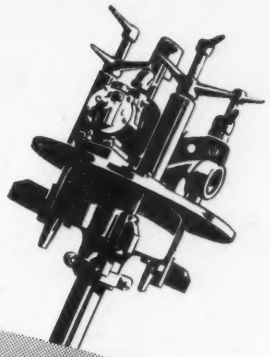
50% Less Cleaning Time

Greater Availability of Tank Cars

No Steaming Out



. . . . when you use

Oakite Interior Tank Car Cleaning Unit

Tank car turnaround bottlenecks have been broken time and time again with the Model No. 324, Oakite Interior Tank Car Cleaning Unit. This specially designed detergent-spraying apparatus, on lease to Oakite customers, cuts tank-car cleaning time in half because it eliminates time-consuming manual brushing, scraping and steaming out.

For example, in cleaning lubricating and light-oil tank car carriers you can figure on ½ to 1 hour cleaning-time with this amazing mechanized cleaning unit. For cars containing heavy oils, creosote, etc., count on 1 to 3 hours time for thorough Oakite clean-up.

Spray nozzles of the Oakite Interior Tank-Cleaning Unit move together. They rotate both vertically and horizontally with the result that soiled surfaces receive direct-impact spray every 15 minutes. Operation, after installation, is entirely automatic. Unit is also used for rinsing, after cleaning. And it may be used for stripping paint.

Ask your nearby Oakite Technical Service Representative, for complete operational data on this unit, including solution concentrations, temperatures, pressures, spraying and rinsing time for different types of tank cars and deposits. Free, without obligation. Do it today!

OAKITE 1909 1949 40th ANNIVERSARY YEAR

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TRADE MARK REG. U. S. PAT. OFF.

PETROLEUM SERVICE DIVISION

OAKITE PRODUCTS, INC., 44C Thames St., NEW YORK 6, N. Y.

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when the shape is TUBULAR and it must be TOUGH-

Slush pump liners get a final check-up at Barium Steel & Forge before shipment.

NEED slush pump liners? They'll be ready when you want 'em! Extruded liners are not "just a sideline" at Barium. One of our forging presses is set up to make nothing but products of this type . . . for this reason our deliveries are dependable.

The die extrusion method produces tubular shapes of excellent uniformity in metallurgical quality and dimensions. Subsequent hardening and machining of die-extruded forgings is thereby simplified. Made from quality steels, our liners are built to stand the gaff.

Barium can furnish standard size slush pump liners of any desired analysis in "As Forged" or "Rough Machined" condition. Similar shapes adaptable to other uses can be made by the extrusion forging method. Let Barium know your requirements.

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BUCYRUS-ERIE SPUDDERS

are hitting 'pay' across the U.S.A.

48-L in Texas...

Drilling into pay formations or handling various oil well servicing jobs, the big capacity Bucyrus-Erie 48-L always delivers the smooth, economical performance that pays off in increased profits. Capable of swinging up to 6000 pounds of tools, the 48-L pictured saved its Texas owner both time and money in swiftly putting down this top-to-bottom well near Graham, Texas. The rig is equipped with an auxiliary A-frame leg which enables it to handle casing loads up to 160,000 pounds. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

Drill Sales Division offices in Dallas, Texas; Englewood, New Jersey, and Evansville, Indiana.

BUCYRUS ERIE

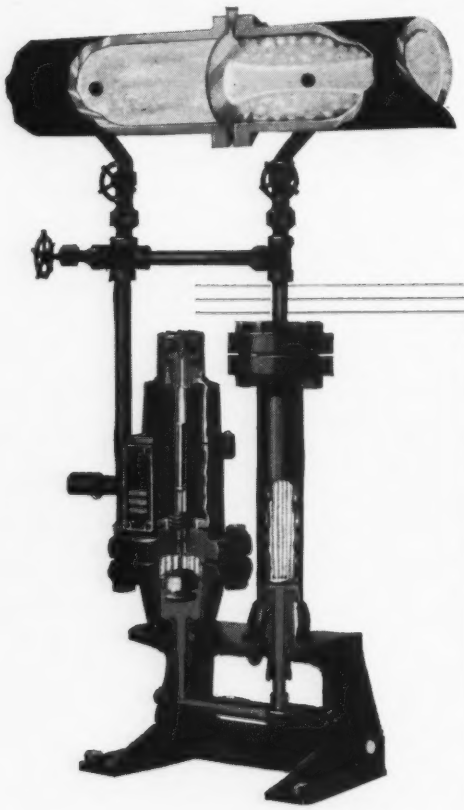
48-L

AVAILABLE FOR PROMPT DELIVERY

45548

THIS FLOW METER DOES IT

gives you the benefits of Proved Performance with Minimum Maintenance plus Close Coupling



YES *proved performance through continuous acceptance for years in thousands of installations.*

YES *minimum maintenance because it is easily cleaned and calibrated.*

YES *close coupling because the meter body can be mounted right at the point of measurement.*

You can have close coupling to the point of flow measurement with close control of fluid flow from a remote location. Control may be obtained through any of four pneumatically operated systems . . . control as precise, as accurate, as close as the process justifies.

Maintenance is extremely low . . . range tubes are interchangeable and can be cleaned in a matter of minutes.

For close coupling to the line and close control of fluid flow, your best bet is the Brown Electric Flow Meter. Call in your local Brown engineer for free consultation and advice, today . . . he is as near to you as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
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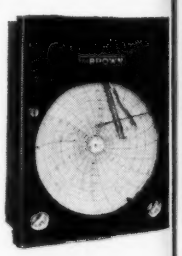
Offices in principal cities of the United States, Canada and throughout the world

Write, today, for your copy of Catalog 2221 . . . for detailed information. No obligation.



MINNEAPOLIS **Honeywell** *Advanced Instrumentation* FOR THE PETROLEUM INDUSTRY **BROWN** INSTRUMENTS

JR ROEBLING

WHEN TO SPECIFY

I.W.R.C.

(INDEPENDENT WIRE ROPE CORE)

Preformed "Blue Center" Wire Rope

PERFORMANCE-PROVEN WITH OIL MEN

IN THE TOUGH SPOTS, rope with an Independent Wire Rope Core gives best and longest service! I.W.R.C. is outstanding where operating pressures are high; where heat resistance, additional strength, or minimum stretch are essential. But remember this . . . *the same features that make* I.W.R.C. *best for the tough spots help make it the longest-performing and most economical specification for a wide range of applications!*

As rotary drilling lines, Roebling 6 x 19 Preformed "Blue Center" Steel Wire Rope with I.W.R.C. has demonstrated *extra* life on the job and substantial dollar savings. And, of course, Roebling Preformed construction brings greater ease of handling, top flexibility, less tendency to kink or foul.

Have your Roebling Field Man help select the *right* rope for your special requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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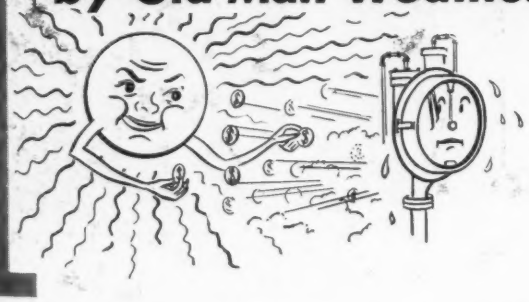
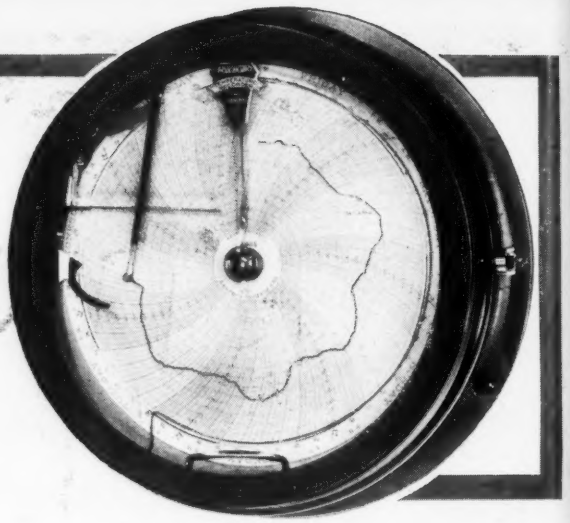
ROEBLING

☆ A CENTURY OF CONFIDENCE ☆

Are you being SHORT CHANGED by Old Man Weather?

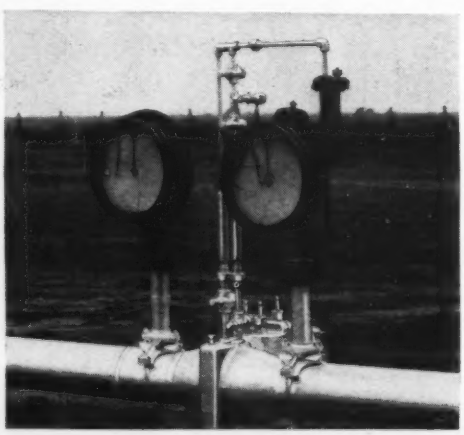




THE standard two pen meter for measuring gas-flow gives only part of the facts you need to balance your records correctly. It does not reveal expansion or contraction losses due to the vagaries of Old Man Weather.

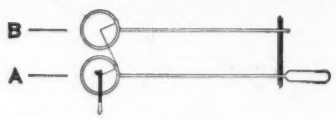
To avoid being *short-changed* when the heat is on or to avoid delivering sub-standard volume when the heat is off, you need to know gas temperatures. A variation of 10°F. causes an error of 1% in metered volume with an orifice meter—twice as much with a positive meter. Such errors can lead to a sizable loss of income.

With Foxboro Anti-Ambi Temperature Recorders, you'll get continuous accurate records of gas temperature . . . permitting full correction for every variation and precise accounting of deliveries. You'll find them sturdily constructed, dependably accurate, and designed to withstand the roughest conditions with a minimum amount of servicing. That's why you'll find more of them in gas pipeline services today than all other makes combined.

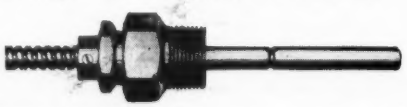


Write today for Bulletin 198-6. Get all the facts on how these better-engineered instruments are changing lost B.T.U.'s into cash. **The Foxboro Company, 60 Neponset Avenue, Foxboro, Mass., U. S. A.**

TYPICAL FOXBORO REFINEMENTS



The diagram above shows the Foxboro automatic compensation for ambient temperatures. Both the primary measuring system (A) and compensating system (B) are contained in the same instrument case (and length of protective tubing). The compensating system acts as an automatic zero setting for the primary system. Instrument and compensation are calibrated at the same time.



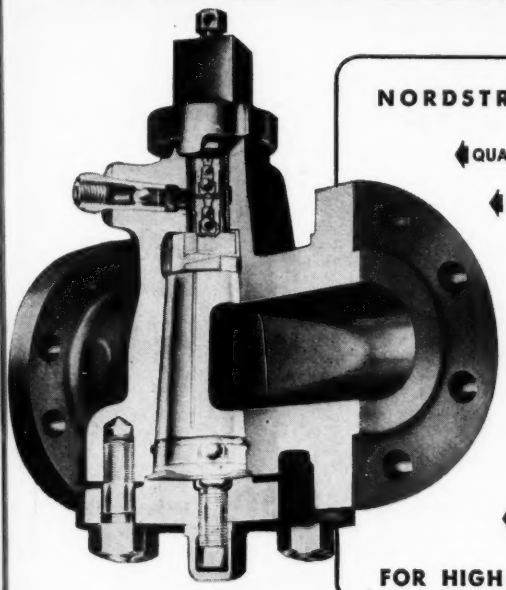
This drawing shows the small diameter quick-response bulb used with the Foxboro Anti-Ambi Thermometer. The bulb is made with a stainless steel neck to reduce conduction effects.

The bulb is protected by the special socket shown above. It has special aluminum fins for rapid heat transfer to the bulb and a stainless steel extension to minimize heat conduction to the socket head.

FOXBORO REG. U. S. PAT. OFF.

Anti-Ambi THERMOMETERS

NORDSTROM MERCHROME COATING ADDS AN ARMOR OF HARD FACING TO RESIST MUD LINE ABRASION



NORDSTROM HYPRESEAL

- QUARTER TURN OPERATES VALVE
- PLASTIC SEAL AROUND STEM
- PRESSURE LUBRICATION
- FULL FLOATING PLUG
- POSITIVE BALL THRUST
- IMPERVIOUS BOTTOM SEAL

FOR HIGH PRESSURE SERVICE

When drilling, mud flows through a Nordstrom lubricated valve at high pressure and velocity. It passes right through the streamlined passageway. There is no place where grit or abrasive particles can lodge. No seat is exposed. To further insure longest life, Nordstrom mud line valves are Merchrome coated. The surface of the plug and its contacting body surface are hard-faced. The Merchroming process insures the hardest, most abrasive-resistant surface possible to produce. It adds life far beyond that of ordinary valves.

We have prepared a new Bulletin (No. V 201) featuring Nordstrom Merchrome coated valves for mud line service. It gives complete specifications; lists sizes, pressure ratings and prices. Ask for a copy.

KEEP UPKEEP DOWN

Use only genuine Nordcoseal lubricants

NORDSTROM VALVE DIVISION

Rockwell Manufacturing Co.

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Atlanta, Boston, Chicago, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa . . and Leading Supply Houses.

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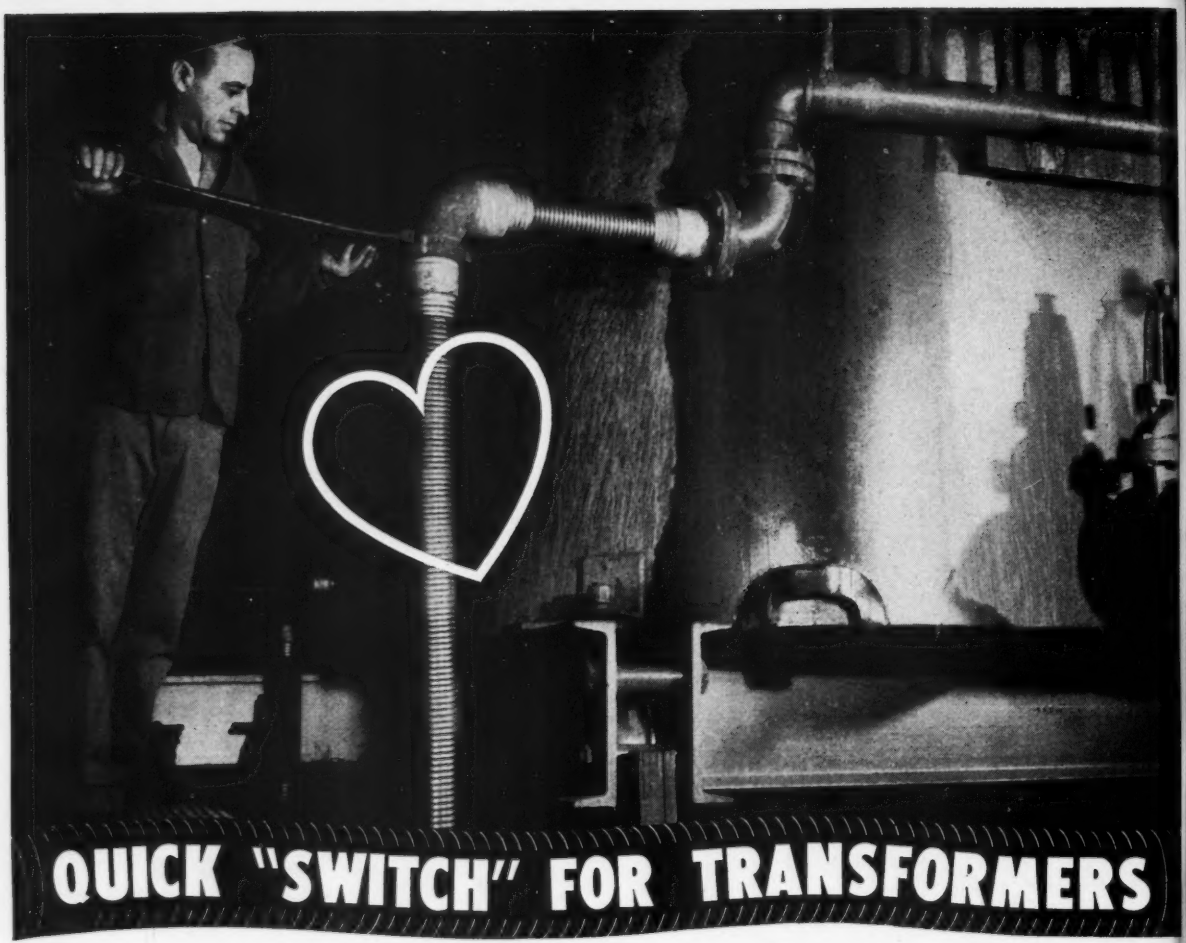
Nordstrom
LUBRICATED VALVES



QUICK "SWITCH" FOR TRANSFORMERS

Penflex metal hose cuts replacement time ⅓
... reduces costs ... speeds power resumption

Replacing faulty 220,000-volt transformers in a mammoth hydro-electric power station became a lengthy, troublesome task for one Eastern utilities company. When one of these 12 giants needs repairs, a spare has to be put in its place and quickly connected to cooling water pipes before resumption of service.

But since no two transformers are precisely alike, it was difficult to line up pipe flanges for bolting. Often special "wedges" had to be machined and inserted to obtain tight sealing . . . pipes had to be heated and bent . . . power output was delayed.

Troubles soon disappeared when Penflex engineers recommended 4" bronze interlocked flexible metal hose assemblies. Now, transformers are switched in almost ⅓ less time. Connections are quickly made because flexibility of hose allows for misalignment. Special machining and bending operations are eliminated . . . power is speedily resumed . . . man-hours reduced.

Penflex "Flexineering" (the science of engineering each type of flexible tubing to the problem) can help you iron out production wrinkles easily, economically. It will pay to know more about Penflex tubing layout service, streamlined for quick solution to your problems on flexible transmission of liquids, air, gases, or light solids. For complete service on flexible hose, tubing and couplings from ⅛" I. D. to 30" I. D., write today to . . .

PENNSYLVANIA FLEXIBLE METALLIC TUBING COMPANY

7213 Powers Lane **Philadelphia 42, Pa.**

BRANCH SALES OFFICES—BOSTON • NEW YORK • CLEVELAND • CHICAGO • HOUSTON • LOS ANGELES

Penflex... HEART OF INDUSTRY'S LIFE LINES

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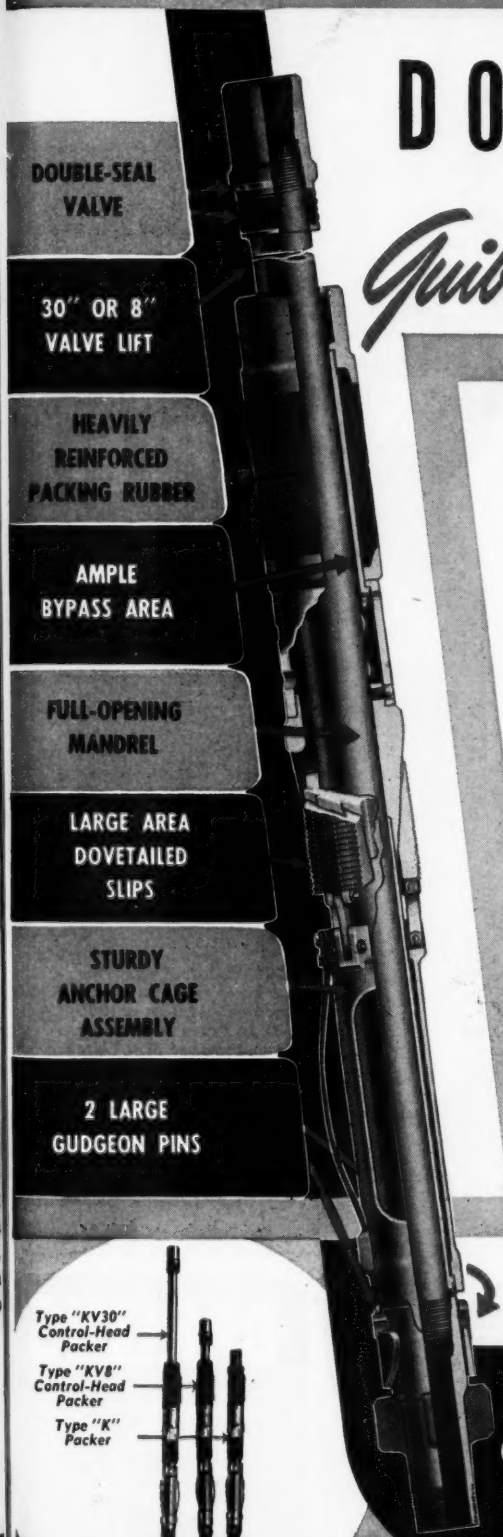
DOUBLE-SEALED

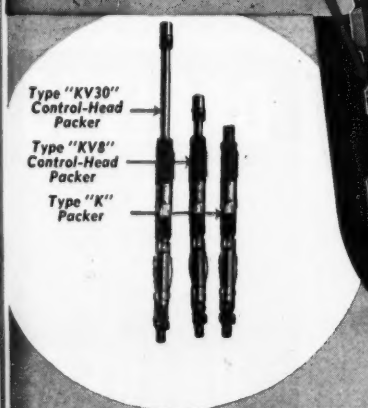
PROTECTION WITH *Guiberson* TYPE "KV" PACKERS



Built for trouble-free performance in deep wells where high pressures and high temperatures are encountered. Guiberson's Type "KV" Packers have double-sealed protection at the valve—the regular tapered metal valve and seat plus a special multi-ring resilient sealing sleeve. The pack-off rubber is oil-resistant, has reinforced ends, and will not vulcanize to the casing. Dovetailed slips are extra large, heat-treated. Heavy seamless mandrel has full opening—internal diameter is same as tubing string. Ample by-pass area permits faster running and pulling in heavy fluid. Valve is locked in open position by rugged gudgeon assembly to prevent closing when running in the hole.

Guiberson "KV" Packers pull with ease. The 30" valve lift on the "KV30" permits a long stroke to dislodge the slips and packing rubber. Type "KV" packers will pull loose easily even with a high head of fluid above the packer, due to the small valve diameter.

Guiberson Type "KV" Packers are ruggedly built of durable materials to give you positive pack-off under the most difficult well conditions. Available in 4 1/2" to 9 5/8" casing sizes. See the Composite Catalog, pages 1508-11, for the complete series of "K" Packers with or without valve.



SAFE THAN SORRY BETTER BE GUIBERSON (REG. U. S. PAT. OFF.)

Guiberson U.S.A.

THE GUIBERSON CORPORATION

DALLAS, TEXAS Established 1919

CALIFORNIA DISTRIBUTOR: The W. R. Guiberson Co., 717 East Gage Avenue, Los Angeles 1, Calif. EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y.

BRANCH OFFICES in Tulsa, Okla.; Longview, Kilgore, Alice, Houston, Odessa, and Wichita Falls, Texas; Lafayette, La.; Wichita, Kansas; Newark, Ohio.

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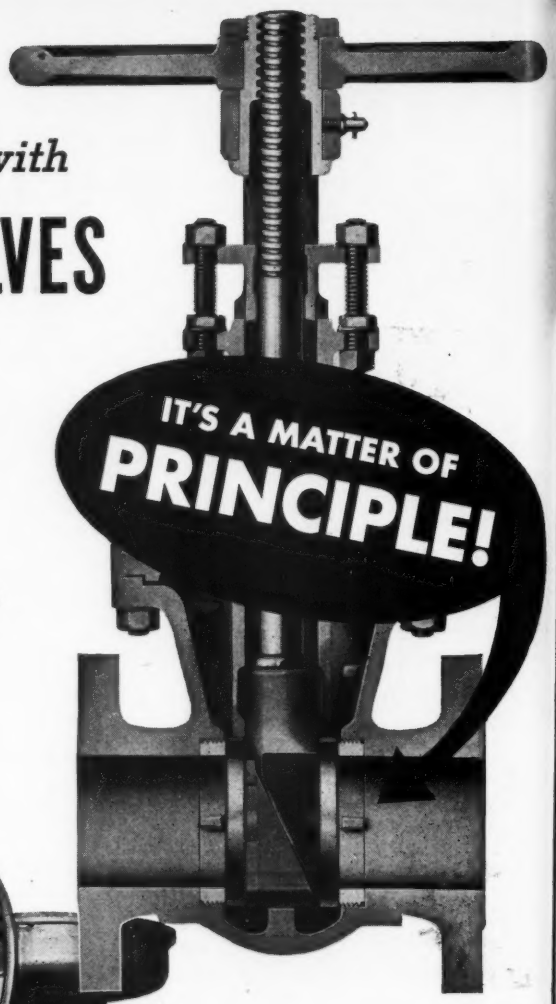
You'll cinch low-cost trouble-free performance with

DARLING PIPE LINE GATE VALVES



THE unique operating principle of Darling Revolving Double Disc Gate Valves offers you a number of cost-reducing advantages. Here are only four of the major ones . . . .

1. **Positive easy closing**
2. **Automatic adjustment for valve body distortion**
3. **Elimination of gate-to-seat galling**
4. **Unsurpassed maintenance economy**

HERE'S WHY. As shown, there are only four simple working parts in the gate assembly—two wedges, two discs free to *revolve!* Discs seat in a different position at every closing. Wear is evenly distributed, prolonging disc and seat life, minimizing maintenance and contributing to positive, tight closing.

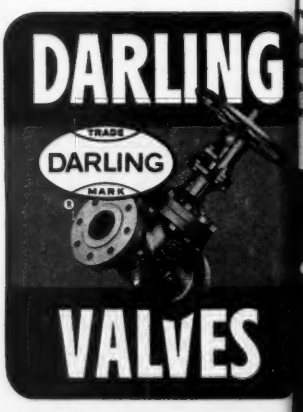
Next, note how face of upper wedge is radiused. Faces are also transverse beveled. This equalizes wedging pressure and *automatically* adjusts for valve body distortion, avoiding leaks, down-time and costly repair.

Finally, see how wedging pressure is exerted *only* when discs are *all the way down,* directly opposite seats. Wedging pressure is released *before* discs are raised. Obviously this eliminates severe friction and galling, makes valve operation *easy,* and prolongs trouble-free life of discs and seats.

There's a Darling Valve ready to bring you these and other advantages in almost any service you can name! Send for the 300-page Darling Catalog No. 17M . . . or identify your needs and get specific data.

Darling 20" cast steel pipe line valve, with bevel gear and grease case, for cold pressures up to 1000 pounds. This Fully Revolving Double Disc Parallel Seat Gate Valve is one of Darling's many gate valve types and sizes available for any normal or unusual service.

The Valve Mark of Quality
. . . watch for it

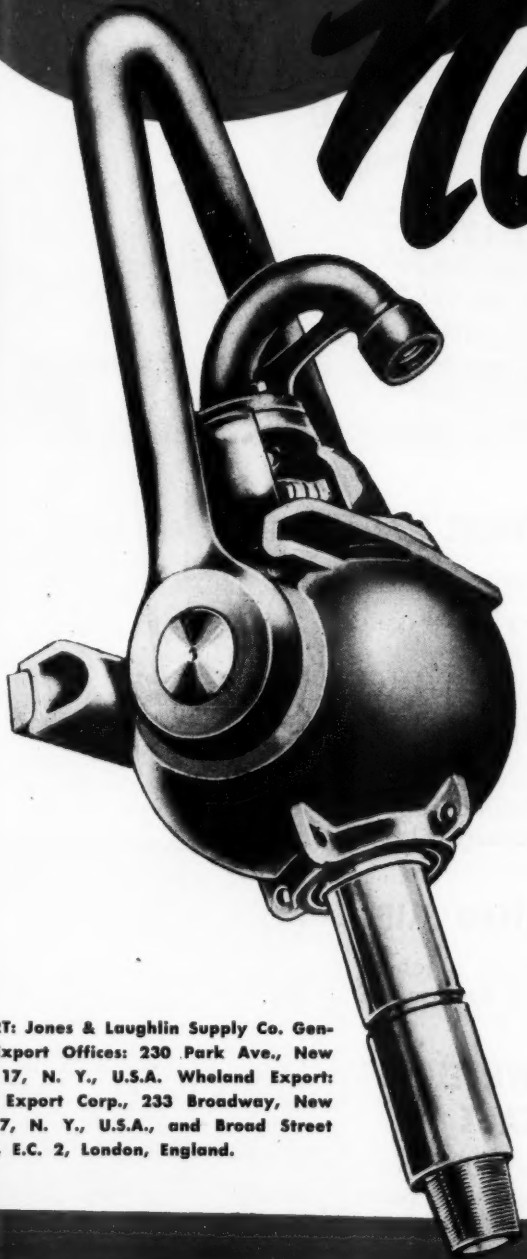


Darling Valve & Manufacturing Co.

Williamsport 1, Pa.

WHELAND SWIVELS

now 4 SIZES



to meet every drilling need!

Specifications

E-6100 — 65 tons at 100 rpm
E-6200 — 131 tons at 100 rpm
E-6600 — 175 tons at 100 rpm
E-7000 — 232 tons at 100 rpm

. . . and there's something about a Wheland Swivel that makes Wheland users mighty loyal. Look into it! Write us at Tulsa today for Wheland Bulletin No. 173, or contact the Jones & Laughlin Supply store in your territory.

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the Valve Packer with the 30-Inch Stroke

YEP-
FULL 30-INCH STROKE LETS YOU PICK UP THE TUBING WITHOUT DANGER OF UNSETTING PACKER-- ..SWELL WHERE TUBING STRETCH IS A PROBLEM

FLOPAK VALVE SEAL

operates even with junk on seat.

FLOSEAL PACKING RINGS

give positive pack-off under extreme conditions of pressure & heat.

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...can't drag, catch or hang up in collars.

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does away with twisting strains on slips, reins and locking action.

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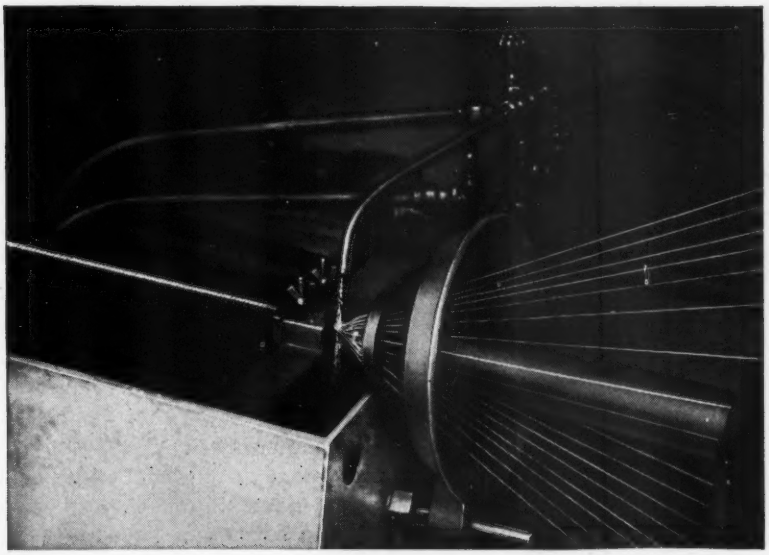

Hot Oil Treatment for Steel Muscles

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

Field lubrication of wire rope does much to prevent friction and corrosion and should not be neglected. However, it is only a *surface* treatment. To provide proper *internal* lubrication, every strand of Wickwire Rope is actually formed in a stream of hot, quick-setting lubricant which packs the many spaces between the wires of the strand.

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Thorough lubrication is only one step in the quality control of Wickwire Rope manufacture—but we at Wickwire believe that *every* step is important to assure finished rope that will provide the utmost in performance, safety and long life.

Wickwire Distributors and Rope Engineers are always ready to help solve your wire rope problems and supply the right rope for your needs. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

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A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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KOEHRING CRUISER CRANES give you extra speed, mobility ...ONE-MAN HANDLING

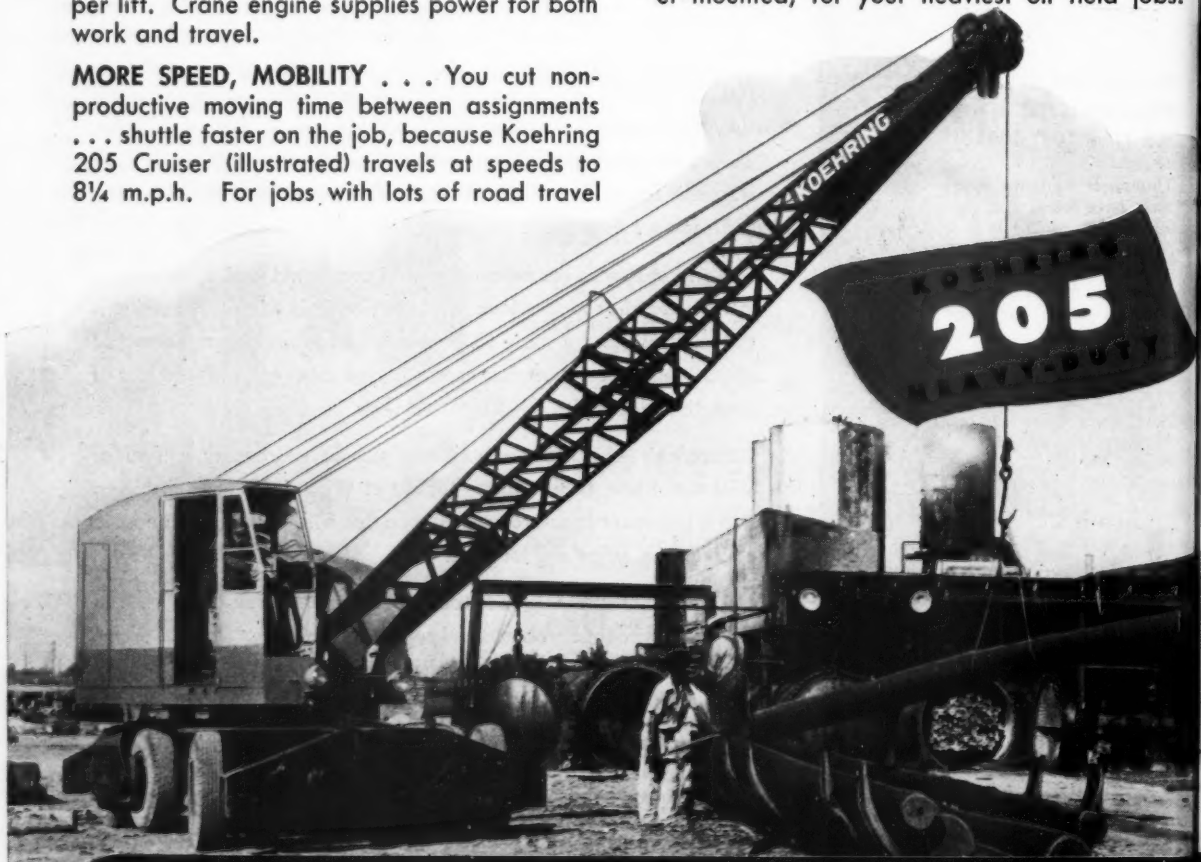
On jobs of short duration, unloading cars, setting steel, handling pipes, tanks, etc. . . . anywhere travel time is an important percentage of job duration, you can earn big savings in time and handling costs with Koehring rubber-tired Cruiser Cranes. You get:

ONE-MAN HANDLING . . . Operator controls both crane work and travel from cab . . . means less man-hours to get job done . . . lower cost per lift. Crane engine supplies power for both work and travel.

MORE SPEED, MOBILITY . . . You cut non-productive moving time between assignments . . . shuttle faster on the job, because Koehring 205 Cruiser (illustrated) travels at speeds to 8¼ m.p.h. For jobs with lots of road travel there is also a truck mounting that gives you 35 m.p.h.

EXTRA LIFT CAPACITY . . . extra stability of rubbed-tired mounting increases 205's maximum lifting capacity from 13,800 lbs. crawler rating to 20,000 lbs. on cruiser mounting. 205 on truck mounting lifting capacity also increases to 20,000 lbs.

That's only a few of the reasons why it pays to use Koehring rubber-tired Cranes, wherever oil field operating conditions permit. Your local Koehring distributor can show you many more time and money-saving advantages. Ask him, too, about bigger Koehring 304, also available on rubber as cruiser or truck. Other Koehring sizes: Big 605 and 1005, both crawler-mounted, for your heaviest oil field jobs.



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SUBSIDIARIES: JOHNSON • PARSONS • KWIK-MIX

and SMALL oil-field jobs.....

KWIK-MIX 3½-S....
utility size DANDIE

- **Pays off on scattered, small-quantity mixing assignments . . . gives you high-quality concrete mixed fast, at low cost anywhere on your property.**
- **Portable as a wheelbarrow . . . balanced light weight and handy push-down towpole provide safe one-man handling on the job . . . easy towing.**
- **Large drum opening, low shoveling height of only 3½′ mean fast, easy charging . . . more concrete mixed per shift.**
- **Convenient end discharge eliminates backing and turning loaded wheelbarrow . . . gets barrow loaded and on its way with ½ the usual effort.**

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On your small materials-handling tasks, you can get 3 to 4 times more production per man-hour with Kwik-Mix 4 h.p. Moto-Bug. Here's why. It hauls 4 times as much (10 cu. ft.) as ordinary hand wheelbarrow . . . makes more trips per hour because it's *fully powered,* travels 1½ to 4 m.p.h. forward and reverse. No pushing . . . no pulling . . . no end-of-day "slow-down". For complete facts on its controlled gravity dump . . . positive steer arrangement . . . *standard make* 4-cycle gas engine . . . and 1200 lb. capacity flat-bed platform, see your local Kwik-Mix distributor, or send for bulletin.

KKM923

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NAME.....TITLE.....

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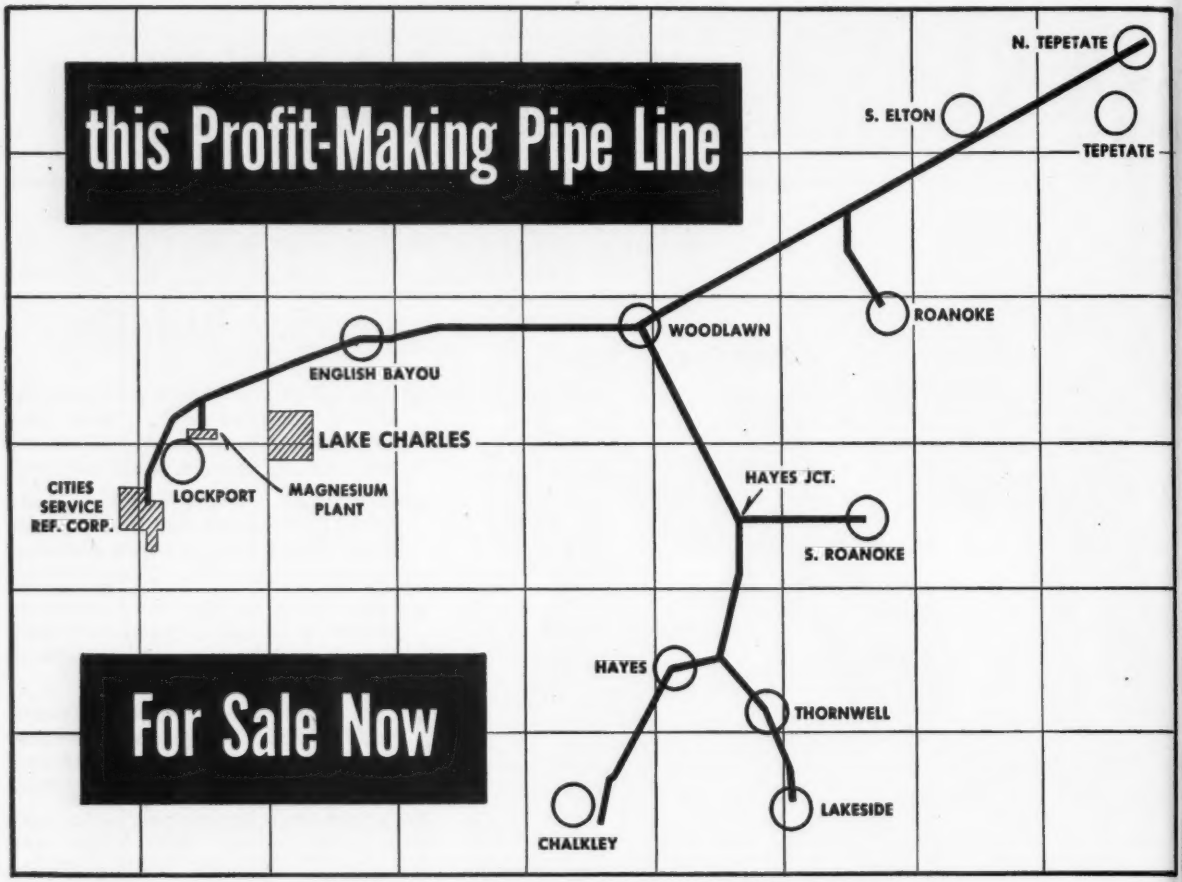
CITY.....STATE.....

Also send ☐ bulletin ☐ price information on low-cost MOTO-BUG.

KWIK-MIX COMPANY
Port Washington, Wis.
KOEHRING SUBSIDIARY



Lake Charles (Louisiana) Gas Line System . . . Plancor 1118

This gas line system is a going concern offering a profitable investment opportunity. It is offered for sale on a "where is, as is" basis, for use in place and for continuing operation.

This offer, identical with that advertised in January with a cut-off date of February 10, 1949, establishes a new cut-off date of April 18, 1949.

★

THE PROPERTY consists of about 100 miles of gas transmission lines of varying diameter, three tracts of land totaling 4.827 acres and right-of-way strip for the entire length of the system. Other improvements include metering stations, dehydration stations, a two-way radio system and miscellaneous buildings. There are no compressor stations, since well pressure is used to propel the gas.

Pipe is high-pressure welded steel, coated and installed through the Louisiana Parishes of Calcasieu and Jefferson Davis and into Cameron and Acadia Parishes. Most of the line is 10, 12 and 16-inch pipe, with some 6, 8, 14 and 20-inch. This well-built line has received first-class maintenance at all times and has been a consistent net income producer.

LOCATION. Starting near the city of Lake Charles, this line extends to Woodlawn, North Tepetate, Lakeside and Chalkley. It serves a group of well-diversified industrial plants and is capable of serving others placed in its distribution scheme.

The line takes gas from six different suppliers and there are additional potential sources. Gas supply contracts range in terms up to 25 years, with renewal options and renegotiation clauses in the contracts.

SEALED BIDS for the purchase of this line will be received at the Washington, D. C. address below until 2:00 P.M., E.S.T., April 18, 1949, at which time all sealed proposals will be publicly opened and read. Interested parties will be given every opportunity to inspect the property and study engineering reports and other pertinent data. For bidding instructions, descriptive information and illustrated brochure, write to the address below or to the Office of Real Property Disposal, War Assets Administration, P. O. Box 6030, Dallas, Texas.

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Checking precision threads on Pittsburgh Special Drill Pipe at Pittsburgh Steel Company

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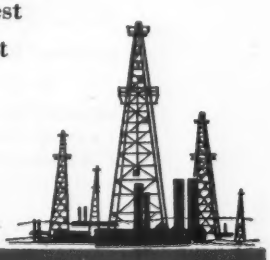

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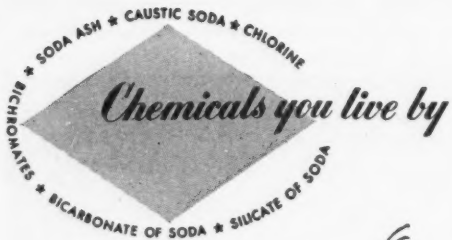
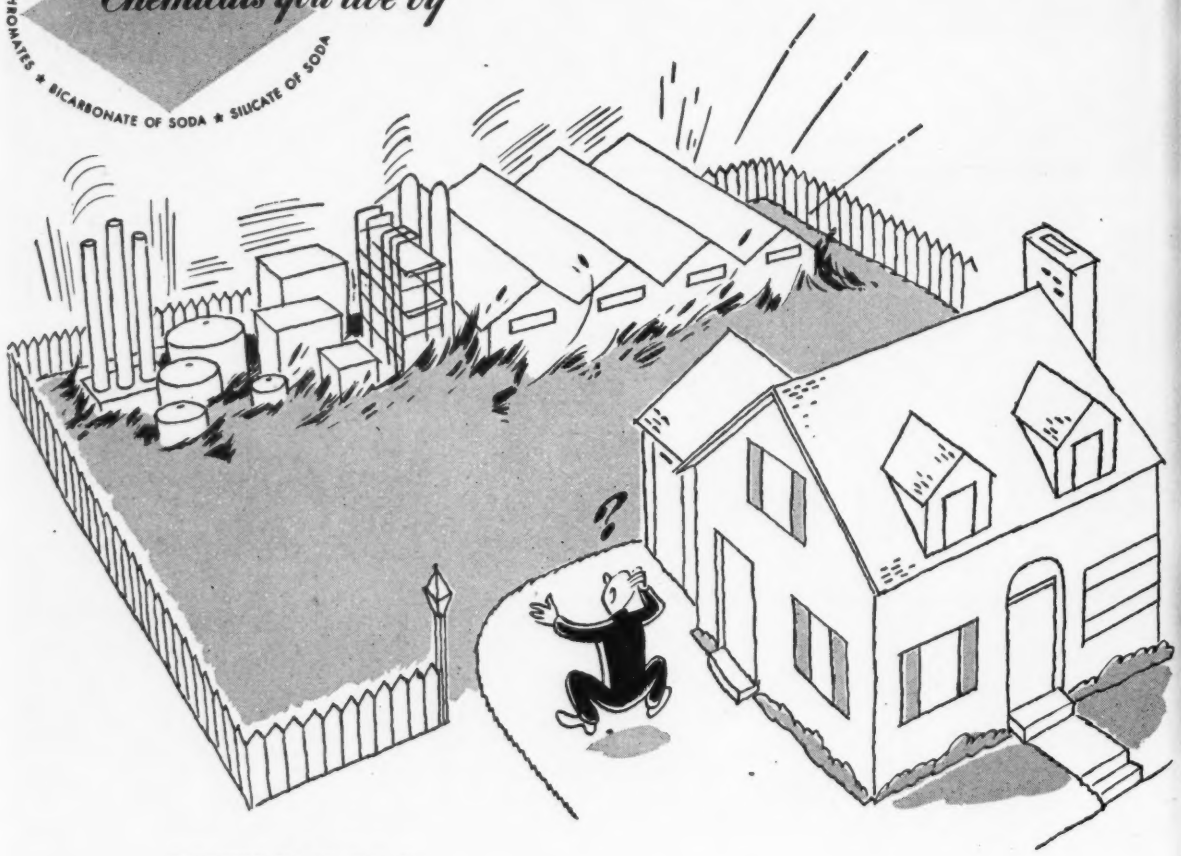
Pittsburgh Steel Company





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Whether your oil production or refining is in the Southwest, the Midwest or on the Atlantic Coast, chances are there's a DIAMOND ALKALI plant, making chemicals you need, right in your own back yard.

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Put the squeeze on high suction costs

Use Hewitt Mud Pump Suction Hose

Just one try is all it takes to discover the profit protection advantages of Hewitt Mud Pump Suction Hose.

When you use it you avoid hose replacement, kinking and collapse under suction. That's because its tough carcass is reinforced by spiraled spring steel wiring.

With Hewitt Mud Pump Suction Hose you avoid *all* possibility of the tube pulling loose under suction. Hewitt adds a ply of breaker fabric to strengthen the bond between inner tube and carcass. Built-in clampless nipples are permanently sealed and anchored in the hose.

All these features are protected for you by a tough, heavy cover. It's especially compounded to withstand severe abrasion, rough handling and extreme weather conditions.

Find out today how Hewitt Mud Pump Suction Hose can cut your high suction costs . . . boost your production efficiency. Call your Hewitt distributor listed in the classified section of the telephone directory. Or write to Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York.

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Hewitt offers the oil industry a complete line of special hoses

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- Flexible Vibration Hose
- Mud Pump Suction Hose

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- Oil Suction and Discharge Hose
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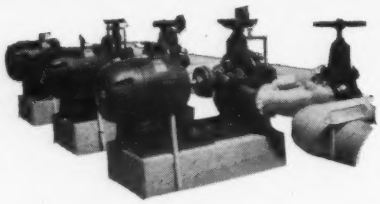
also Propane-Butane Hose for all types of service

HEWITT-ROBINS HR **INCORPORATED**

How do

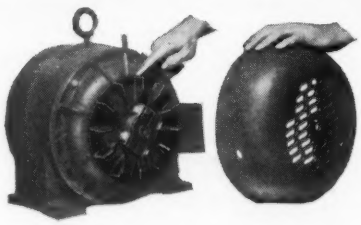
ON MOTORS



Q. As applied to a motor, what does "explosion-proof" actually mean?

1) *That the motor's operation is not affected by external nearby explosions?*
2) *That gastight construction prevents entry of gas or vapors that might explode inside the motor?*
3) *That the motor's enclosure withstands internal explosion and keeps sparks from escaping outside?*

A. An explosion-proof motor (Class I Group D) has an enclosure which will withstand an explosion of a specified gas or vapor which may occur within it, and prevent resulting sparks, flashes, or explosions from igniting the specified gas or vapor surrounding the motor. G-E makes the most complete line of motors tested and listed by UL for hazardous locations in refinery service—in some cases, the only ones so listed. See Bulletin GEA-4131.

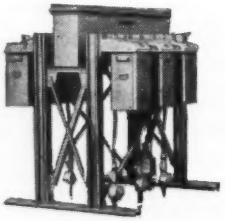


Q. What's the newest development in corrosion resistance for refinery motors?

1) *A newly developed paint immune to acids and alkalies?*
2) *A new type of cooling fan?*
3) *A special grease lubricant for ball-bearings?*

A. It's G-E's new Textolite® corrosion-resistant cooling fan, now supplied in all Tri-Clad® totally enclosed fan-cooled motors in ratings from 1 to 15 hp. Added to Tri-Clad's corrosion-resistant cast-iron enclosure, the new fan now makes these standard, off-the-shelf motors available for refinery service regardless of the acids and alkalies that may be encountered. It's nonsparking, too, and tested and listed by UL for use in explosion-proof motors for hazardous areas Class I Group D, and Class II Groups E, F, and G. Send for Bulletin GEA-4400 on Tri-Clad totally enclosed motors.

Q. If you were placing low-voltage control in a hazardous or semi-hazardous location, what equipment would you specify?



1) *Separate units and wall-mount?*
2) *Circuit breakers separate from starters?*
3) *A factory-assembled group unit?*

A. The convenient, time-saving way is to specify a racked-up assembly of G-E combination starters and breakers designed especially for indoor or outdoor refinery use. It's a standard, factory-built arrangement, with all control units mounted on a self-supporting framework. Available are corrosion-resisting, oil-immersed, and air-break explosion-proof types, the last two for Class I, Group D locations. Bulletin GEA-3541 gives data on oil-immersed starters.

GENERAL ELECTRIC

...you rate AND CONTROL?

Q. When you want to combine high-voltage motor control with short-circuit protection in a semi-hazardous area, what do you do?

1) *Order circuit breakers magnetic starters, and overload relays separately?*
2) *Specify group-assembled controllers as one unit?*
3) *Install magnetic starters and provide for short-circuit protection by means of separate safety switches?*

A. You would do best by specifying high-interrupting capacity G-E refinery-type Limitamp controllers, with sealed current limiting fuses which serve both as fuses and disconnect switches. Contactors are oil immersed or in explosion-proof cases. These compact units are completely wired ready to be quickly and inexpensively installed. They are furnished as single units or as a complete group of several units, including incoming oil-circuit breakers and transformer feeders. Check Bulletins GEA-4247 and GEA-3660.

Q. For what reason would you specify a motor control center?

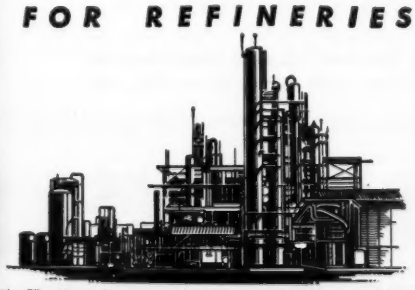
1) *It saves space?*
2) *It simplifies future expansion?*
3) *Easy installation and maintenance?*

A. All three features characterize the new G-E motor control center, with which you can plan the right combination for your plant's needs. Compact, self-enclosed starting units (in four size ranges, from NEMA size 1 to 4, inclusive) fit interchangeably within vertical sections. Front-connected wiring simplifies installation, changes and maintenance. Sections can be placed back to back or against a wall to utilize available plant space. Bulletin GEA-4979 describes the new G-E motor control center.

G.E. MAKES DOUBLY SURE YOU GET THE RIGHT ELECTRIC EQUIPMENT

Bring your questions on the selection of motors and control to General Electric. For G.E., over the years, has developed the most complete line of electric equipment to meet specialized refinery needs. What's more—to make doubly sure your selection is correct—G.E. teams up two or more engineers to advise you. Specialists who know their particular lines of electric equipment inside out work hand in hand with an "industry" man who is thoroughly at home with refinery practice and electrical needs. With their pooled knowledge and experience to draw on, you're certain to meet your requirements practically, economically. Check your nearest G-E office and help yourself to this "extra." For more information on motors and control, send in the coupon.

MOTORS AND CONTROL FOR REFINERIES



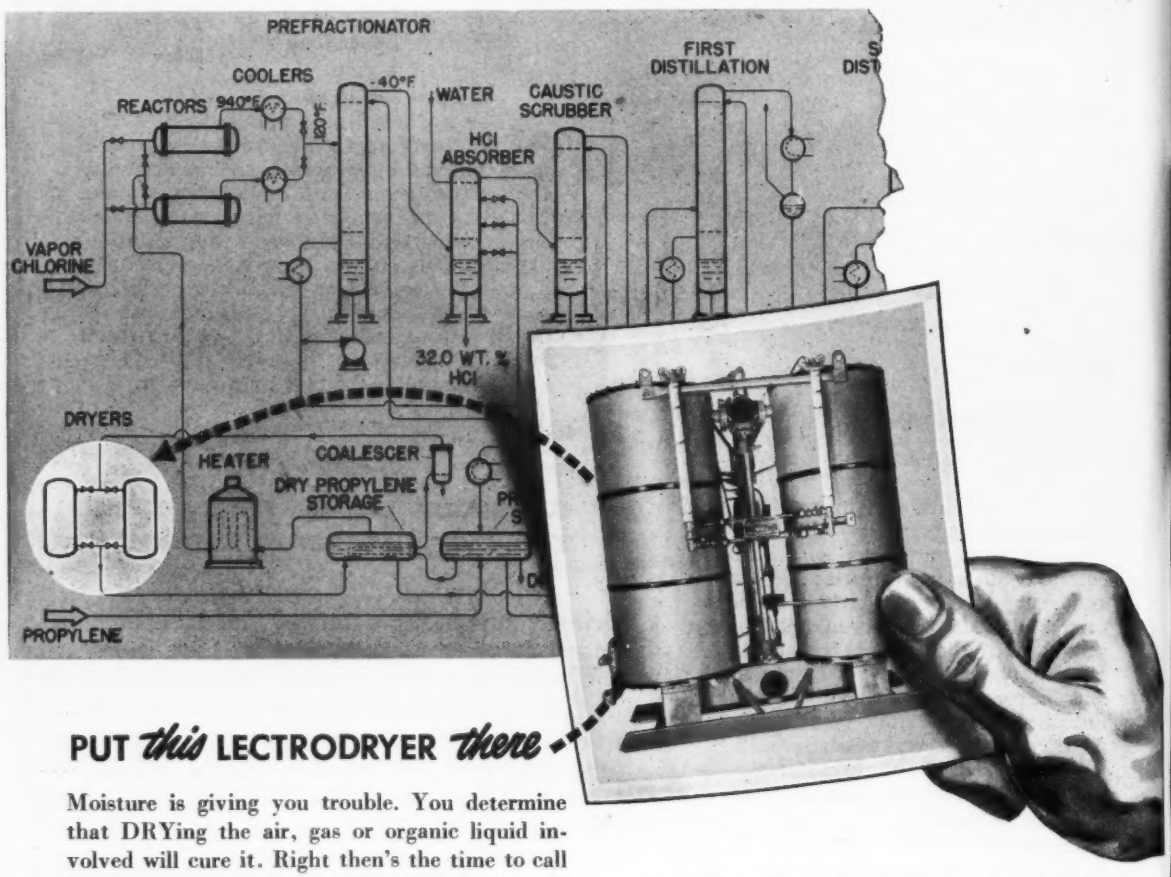
General Electric Company, Section E654-87
Apparatus Department, Schenectady 5, N. Y.

Please send me the following information on G-E motors and control for refineries.

.....*GEA-4131—Motors and control for hazardous locations*
.....*GEA-3541—Oil-immersed starters*
.....*GEA-4400—Tri-Clad totally enclosed fan-cooled motors*
.....*GEA-3660—Limitamp controllers with oil-immersed contactors*
.....*GEA-4247—Limitamp controllers with air-break contactors*
.....*GEA-4979—Motor control center*

Name.....
Company.....
Address.....
City.....State.....

LECTRODRYER* STANDS FOR A MACHINE *and* A SERVICE



PUT *this* LECTRODRYER *there*

Moisture is giving you trouble. You determine that DRYing the air, gas or organic liquid involved will cure it. Right then's the time to call in a Lectrodryer representative; don't wait until the requisition for a machine is written.

DRYing engineering, as practiced by Lectrodryer, goes into action immediately after moisture is recognized as the culprit. Our men help select the type and size of DRYing machine that's needed, what controls and other accessories are needed, and the most efficient layout. They see that the equipment works, and continues to work, smoothly and efficiently in your plant.

Lectrodryer's recommendations are based on many years of experience with DRYing work in hundreds of plants, in dozens of industries, all over the world. That's why so little service is required to keep Lectrodryers operating at their original high efficiency.

For help on your DRYing problems, write Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pennsylvania.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
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1. *Full-size streamlined bore* . . . assures smoother flow of fluids, less abrasive wear
2. *Longer bearing length* . . . maintains perfect alignment of all working parts, less torque in turning
3. *Removable loading plug* . . . simplifies maintenance without adjustment, easier access to bearings
4. *Chevron-type packing* . . . provides longer service, easier repacking
5. *Greater roller-bearing contact areas* . . . greater safety against thrust and shock loads, easier turning
6. *Stronger end-seal* . . . packing prevents abrasion from fluid turbulence
7. *Better grease seal* . . . assures better lubrication, better sealing against leaks
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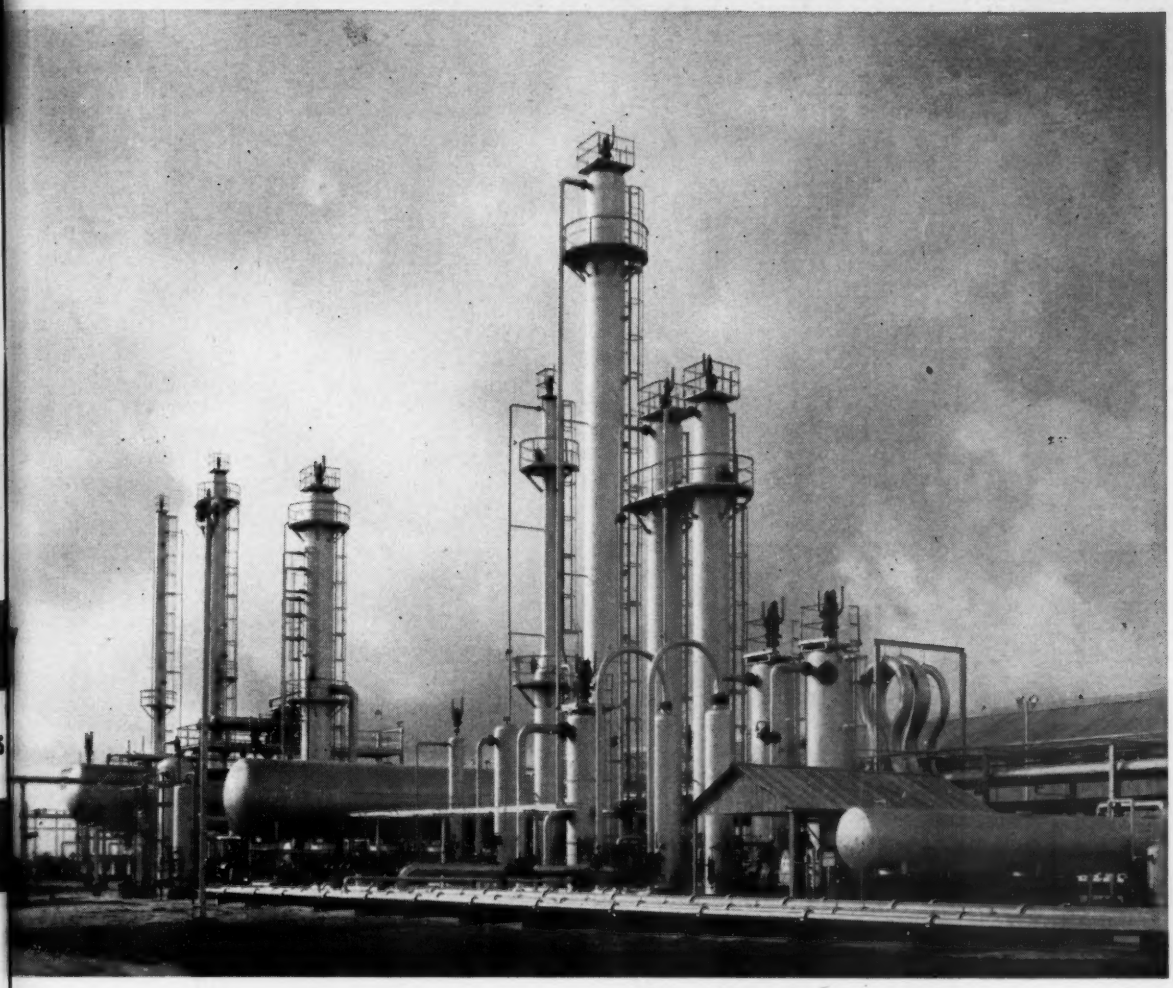

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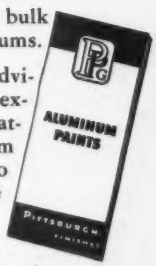

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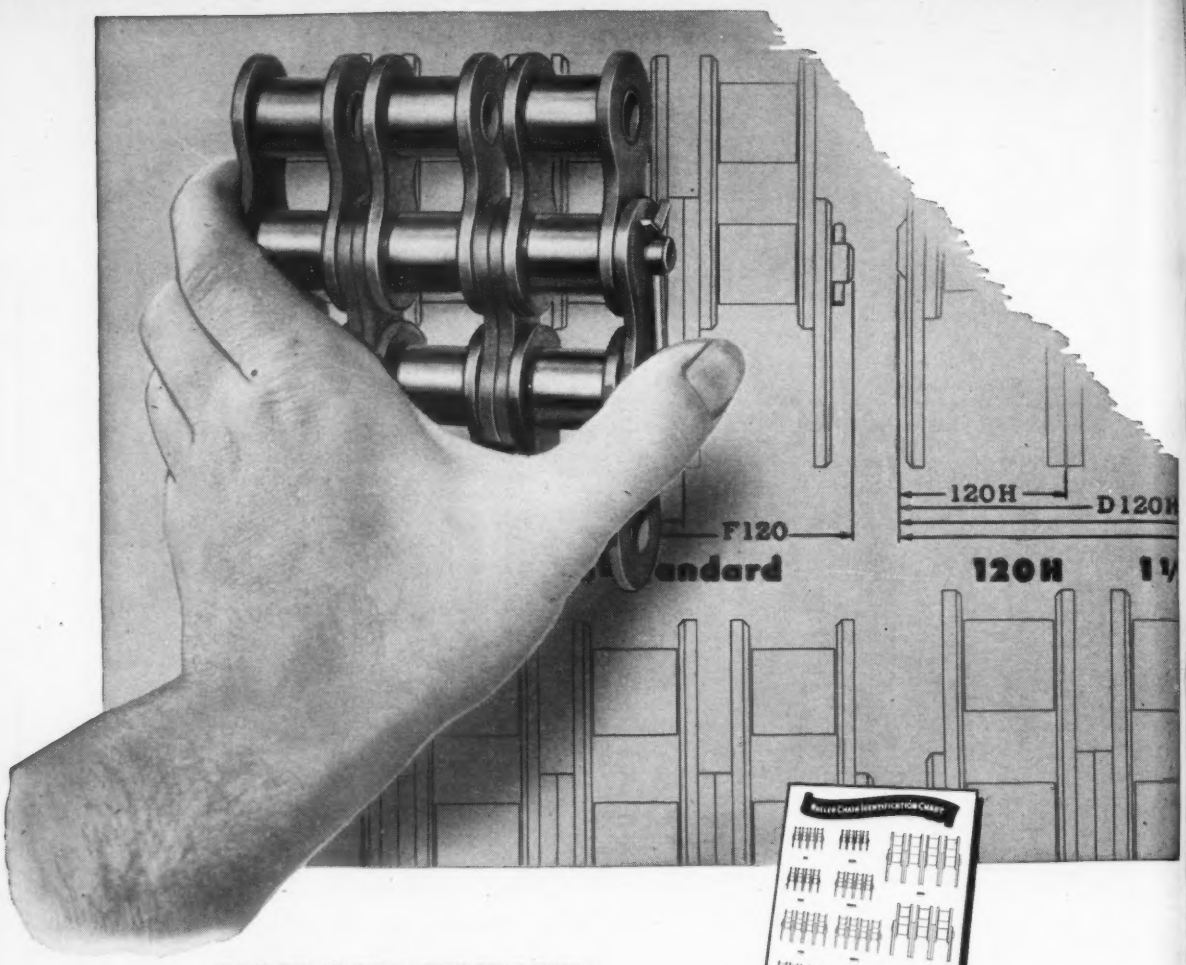

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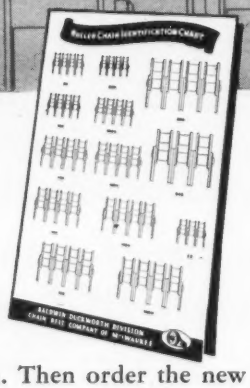
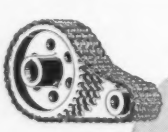


To simplify replacement of roller chain on drilling and servicing rigs . . . to make it easy for you to be sure of correct replacement size, we have prepared this new wall chart of Oil Field Roller Chains.

Here's all there is to it. Just compare the worn chain with the drawings on the wall chart. One of the illustrated chains will exactly match your chain. The chain on the chart is clearly labeled by number and pitch. Then order the new chain by number from your local supply store. It's as easy as that!

Send for your free copy of this time-saving wall chart. Keep it in some handy place . . . the doghouse, office, or wherever it will be easily accessible when you need it. Baldwin-Duckworth Division of Chain Belt Company, 357 Plainfield Street, Springfield 2, Massachusetts.



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JOURNALLY Speaking

To Get In On

COMES now "platforming" as a new process in petroleum refining. And what do you suppose it is? A new way of putting trays in bubble towers, maybe? Or building an elevated walkway for employes?

Nope. Nothing so obvious. It has nothing at all to do with platforms. It's a coined word to describe a process of reforming with a platinum catalyst. You can read all about it on page 95 of this issue, but we can't help thinking that while the name is just awfully cute it's apt to be a bit misleading. Reminds us of the politician who said a political platform is like a railroad-car platform; it's not to ride on, just to get in on.

Blue-Water Mystery

IF that burning well in the Gulf of Mexico could have managed to hold out one more day, the picture on our "This Week" page last issue would have been most timely. The day the book got in the mails something happened, though we aren't entirely sure just what. The news dispatch said the well cratered and the drilling platform and barges fell into the hole. We would like to present a picture of a crater in the middle of the ocean, but if our roving photographer was there he must have fallen in too, because we haven't seen the pic.

Reckless Reed

AND speaking of pictures in last week's issue, there was one on a pipe-line page of a helicopter. Our peripatetic pipeline editor, Paul Reed, always avid to promote the progress of the pipe-line profession, took a ride in this. Paul has long been an enthusiast of the airplane in pipe-line work, but he now reports that this newfangled contraption, which he describes as looking more like a plumber's closet than anything else, has definite possibilities for the trade. It can, he says, go up or down, forward or backward, left or right, or stop in midair, while the airborne pipe-line patrolman looks below as casually as he cares to.

Old Eagle-Eye

SOMEHOW we can't seem to get away from talking about last week's issue. There were several things in it that struck us funny. One of them was the item Bert Linz had in his "Watching Washington" column about the typographical error in the Congressional Record.

In pursuit of items about what the Government is doing oilwise, the poor guy has to read umpteen pages of the Record's extra-fine print every day. That he doesn't miss many, either, is attested by the fact that he caught the usually letter-perfect Government Printing Office in a typo. Makes us feel better, though. If the Government, with all its staff of expert proofreaders, misses one now and then, maybe we can be excused on occasion.

The Post and Us

NO doubt every pipe liner read the piece in last week's SatEvePost about the troubles Williams Brothers Co. had in laying a measly 6-in. pipe line in Bolivia. We thought it was a pretty readable yarn, but the pipe-line experts around these parts complained that it didn't give enough detail about the pipe line itself and how it was laid. However, that just bears out our contention that for glamour you can have the popular prints, but if you want the real low-down on the how-to-do-it of the oil industry, stick to our favorite oil publication.

Footwork

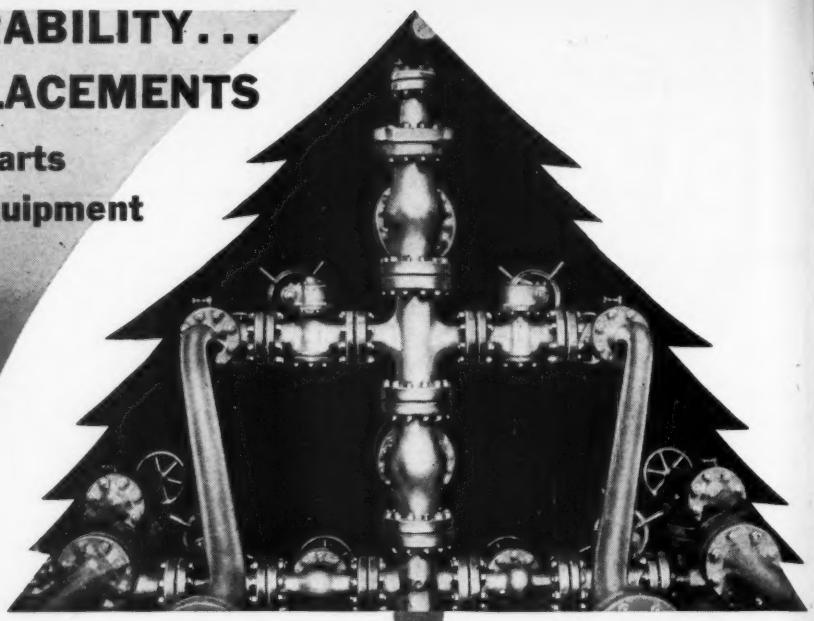
WE have it confidentially from one of our lady operatives that Dr. Frederick H. Lahee, chief geologist for Sun Oil Co., is a most excellent dancer. This would seem to be natural and logical, for a successful geologist has to do a lot of fast and fancy footwork in his business. Dr. Lahee's latest exhibition appears on page 78 of this issue, but we refuse to commit ourselves as to whether it is geological terpsichore or solid stamping.

INCREASE DURABILITY... MINIMIZE REPLACEMENTS

of Cast Parts in Oil Field Equipment

by using

NICKEL ALLOY STEEL CASTINGS



THIS "CHRISTMAS TREE" CARRIES PEAK LOADS

Here are flanged crosses, tees and fittings of cast nickel-chromium-molybdenum steel, produced by Los Angeles Steel Casting Co., Los Angeles, for Regan Forge & Engineering Co., San Pedro, Calif. After normalizing and drawing at 1200° F., these castings show:

Tensile Strength, p.s.i.	100/110,000
Yield Point, p.s.i.	75/85,000
Elongation in 2", %	18/22
Reduction of Area, %	35/45
Brinell Hardness	200/235

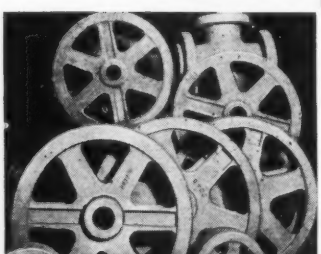
ADVANTAGES

of Alloyed Over Plain Carbon Steel Castings

1. STRONGER . . . HIGHER YIELD STRENGTH
2. LESS BULK and DEADWEIGHT
3. HARDER . . . MORE WEAR-RESISTANT
4. BETTER RESPONSE TO HEAT TREATMENT
5. GREATER SHOCK-RESISTANCE
6. GREATER FATIGUE STRENGTH
7. LESS EMBRITTLEMENT AT SUB-ZERO TEMPERATURES

Nickel alloy steel castings have excellent wearing qualities and withstand combinations of severe static and dynamic stresses. Applications include:

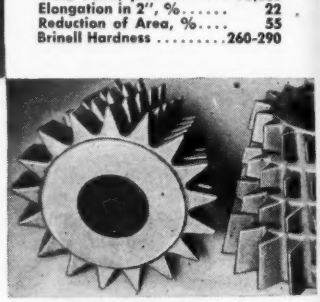
Brake drums	Core tube pullers
Pump bodies	Slush pump valves
Crown block sheaves	Bit bodies and cutters
Traveling block sheaves	Slush pump liners
Drilling valves and fittings	Draw works gears and sprockets



BUILT FOR LONG, DEPENDABLE PERFORMANCE

These gear blanks for pump units were cast in nickel-chromium-molybdenum steel by Texas Electric Steel Casting Co., Houston, Texas, for Lufkin Foundry & Machine Co., Lufkin, Texas. The castings were quenched and drawn to provide:

Tensile Strength, p.s.i.	105,000 min.
Yield Point, p.s.i.	75,000
Elongation in 2", %	22
Reduction of Area, %	55
Brinell Hardness	260-290



CAST NICKEL ALLOY STEEL STANDS THE GAFF

These case-hardened rock bit cutters were cast in a steel equivalent to 4615 type (nickel-molybdenum steel) by Westelectric Castings, Inc., Los Angeles, Calif. They exemplify use of nickel alloy steel castings for service which demands materials far above average in strength, hardness, toughness and dependability.

MAIL THIS COUPON NOW FOR FULL INFORMATION

The International Nickel Company, Inc.
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Please send me your 32-page booklet entitled "NICKEL ALLOY STEEL CASTINGS IN INDUSTRY"

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TRADE MARK

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Company.....

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In This Issue

News

Split FPC Decision Authorizes New Outlets for Southwest Gas ... 40
Court Says Geophysical Crews Need No Surface-Owner Permit ... 40
Texas Producers Fight Imports, Ask Congress to Investigate ... 41
Thompson Forecasts Stricter Texas Conservation Measures ... 42
Sulfur and Microchemistry Chief Topics of Oil Chemists ... 44
Refiners at A.P.I. Meeting See Research as Key to Progress ... 45
Three Technologists Given Honors at Houston A.P.I. Meeting ... 45
Middle East Operations Point to Further Increase in Output ... 46
Slight Decline Shown in Report on Rotary Rigs Running Abroad ... 47
New Company Formed for Pemex Drilling Contract ... 47
Horizontal Drilling Increases Yield of Australian Oil Fields ... 48
Anglo-Iranian Constructing First Lube-Plant in Middle East ... 50
ECA Makes Report on Oil Bought Under ERP ... 50
State Department Noncommittal on Proposal for Mexican Oil Loan 53
Drilling to Start Soon on First Ethiopian Well ... 53
Venezuela Planning for a National Oil Policy ... 53
Plan for Selling Government Rubber Plants Offered by RFC ... 54
Chances for Basing-Point Bill Approval Seem Strengthened ... 56
New Oil, Gas Tax Bills Filed in Texas House ... 56
Annual Reports of Oil Companies ... 57, 141
I.P.A.A. Seeking Methods to Assure Control of Oil Imports ... 60

Engineering - Operating

Huge Caverns at Dollarhide Complicate Drilling Conditions ... 66
West Coast Gets New Wax Plant ... 69
West Red River Field, Oklahoma ... 70
Wildcat Drilling in 1948 ... 78
Summarization Statement on Partial Water Drives ... 87
Various Refinery Applications of Houdriflow Cat Cracking ... 90
Book Reviews ... 94-100
Platforming—New Catalytic Reforming Process ... 95
A.P.I. Digests ... 96
W.P.R.A. Digests ... 99
Refinery Shop Talk ... 101
Questions on Technology ... 104
Engineering Fundamentals—Equipressure and Flow Lines ... 107
Cost-imating—Pipe Stills ... 109

Exploration - Development

Another Important Reef Strike for West Texas ... 123
Highlights of Week's Developments ... 123
Reports by Areas Start on Page ... 124
Weekly Well-Completion Record ... 142
Daily Average Production for Week ... 143

Departments

Journally Speaking ... 35
Editorial ... 39
This Week ... 43
International News ... 46
Watching Washington ... 58
Personals ... 62
Deaths in the Industry ... 64
Pipe-Line News ... 111
Drilling Contractors ... 115
Running High ... 116
Natural-Gas News ... 119
Refining News ... 120
Statistics and Trends ... 142
Market Summary ... 144
Equipment Men in News ... 146
Classified Advertising ... 148
Calendar of Events ... 151
Advertisers' Index ... 152

Protect THOSE LOW-PRESSURE ZONES FROM CEMENT CONTAMINATION

The difficult problem of cementing a string of casing at a predetermined point above the bottom of the hole, while protecting a permeable, low-pressure zone below from cement contamination is successfully being solved by using Baker Triplex Cementing Equipment.

The features of design and construction which insure its successful performance are "tried and true" Baker principles. Baker Metal Petal Baskets have been used universally for years in many types of cementing; and the Baker "Whirler" principle long has been proved superior to jetting action, which may not only fail to prevent channeling, but may wash out cavities with resultant contamination of the cement slurry.

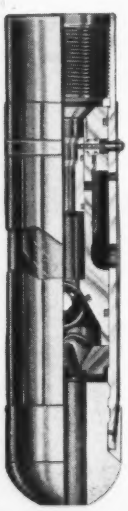
With the Baker Triplex Cementing Shoe (Product No. 136) all cement slurry is directed upward through side whirler ports of the shoe, and a back-pressure valve prevents any return flow of the slurry. The Baker Metal Petal Basket forms a bridge even in large diameter holes; readily conforms to hole irregularities over a wide range of diameters; and prevents the cement slurry from settling in permeable, low-pressure zones below. A Baker Model "G" Casing Centralizer, positioned just above the Triplex Shoe, assists in perfect cementing performance.

ACCESSORY EQUIPMENT OPTIONAL

When it is desired to retain cement tailings inside the casing (thus preventing dilution of the cement slurry around and above the Triplex Shoe) either of two collars may be used, *as illustrated below:*

Baker Triplex Cement Baffle Collar (Product No. 137) is used when a stop for the cementing plug is desired, to retain cement tailings inside the casing.

Baker Triplex Flapper Valve Float Collar (Product No. 134 M&F) provides the safety of an additional float valve, as well as a stop for the cementing plug.



Baker Triplex Cementing Shoe, Product No. 136. Named "Triplex" because it performs a "triple" service: (1) is an efficient float shoe for running-in the casing; (2) whirls the cement slurry upward to minimize danger of channeling; (3) Metal Petal Basket expands to form a bridge which prevents cement contamination of low-pressure zones below.

HERE'S HOW *Triplex* BRINGS YOU "BAKERESULTS"

Ⓐ Baker Triplex Cement Baffle Collar, installed a joint or two above the shoe, serves as a stop for the cementing plug. Ⓑ A hold-down strap retains Baker Metal Petal Basket against the "TRIPLEX" Shoe while running-in. Ⓒ Cementing Ports are covered by Tripping Valve until cementing is commenced. Ⓔ After reaching the desired point in the hole, circulation is established through central passageway. A Tripping Ball is pumped down the hole to seat upon the Tripping Valve. Pressure is applied to shear the Tripping Valve shear screws and force the Tripping Valve downward to expose the cementing ports. Ⓕ Shearing these screws also releases the Basket hold-down strap and allows the Metal Petal Basket to expand against the walls of the hole. Ⓓ A resilient rubber, sleeve-type, back-pressure valve opens readily (see dotted white line) to permit passage of slurry into annulus above. Cementing then is carried out in conventional manner with cement slurry directed upward by the exclusive Baker "Whirling" action. Only readily drillable materials are used for all internal parts.—Look in your BAKER (or Composite) CATALOG, or write to BAKER OIL TOOLS, INC., at Houston, Los Angeles, or New York for complete information.

BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

BAKER *Triplex* CEMENTING EQUIPMENT

THE OIL AND GAS JOURNAL

Unanswered Problem

CONCEDING that the threat of immediate oil shortages is behind us, Interior Secretary Krug in his annual report last week nevertheless predicts further deficiencies and continues to favor the "rapid development" of synthetic substitutes.

He explains that the development of a synthetic-fuels industry should be accomplished by private operators with government support. Let no one be deceived by this approach. It is acknowledged that a synthetic program such as government officials are sponsoring would cost at least 10 billion dollars. No doubt after completion, because of comparative costs, the operation would have to be subsidized. This is not a commercial undertaking in which private industry could logically participate. It is a typical enterprise of the Government which, in this case, to save its face would insist on complete control to include the lower-cost producing facilities based on petroleum.

The Krug report, as do other recent analyses within and outside the oil industry, serves to emphasize a problem which to date lacks an answer. Domestic producers after the war said that given an adequate price they would supply the constantly mounting needs of the postwar period.

This has been done. Despite the heavy demands, exploration and development have been expanded until we are now approaching a normal relationship between what we prefer to term "working reserves" and current needs. But government officials and others are saying that we must have much larger established reserves in this country.

In the light of what operators have done over the past 3 years, there is every reason to believe that, if necessary, several billion barrels over present totals could be added to reserves. But this presents a practical problem. To accomplish such an objective there must be assurance of commensurate price. Experience over a period of years has shown that when the ratio of working reserves to current production exceeds a relationship of around 12 to 1 there are excess supplies which, if continued over a period of time, become dominant in product prices and then crude-oil markets.

While adjustments in some product prices from the peaks of last year were inevitable and desirable, a substantial decline in the industry's revenue will cripple its operations and would tend to end any further increases in reserves. The 1948 annual statements support the need for a continuance of last year's price levels. After maintaining their position as the nation's largest taxpayers, oil companies utilized the bulk of the 1948 profits for high-cost maintenance, modernization, and expansion.

State conservation bodies alone can't solve this problem of maintaining high reserves and satisfactory prices, nor can oil operators until they have much more freedom of collective action than they now have. It will be a further commentary on the competence of the national Government if it spends additional billions of the taxpayers' money on a synthetic program when there is a comparatively simple solution to the supply problem involved within the framework of the tax-paying petroleum industry.

Split FPC Decision Authorizes New Outlets for Southwest Gas

THE precarious and uncertain nature of the Federal Power Commission's policy toward the construction of additional long-distance transmission lines for natural gas is illustrated in its action last week on a series of combined applications of Texas Gas Transmission Corp. and Texas Eastern Transmission Corp.

The projects had been before the commission for more than 2 years, and the certificate permitting construction was issued by a two-to-one vote, with the other two commissioners not participating.

The delay was caused by disagreement within the commission over FPC policy with regard to the quantity of natural-gas reserves which should be required to be committed to a new trunk-line project, and the extent of the commission's jurisdiction over financing of natural-gas companies.

As finally granted, the FPC certificate authorizes a $97,500,000 pipe-line construction program drafted by the two companies to carry natural gas from the East Texas, Texas Gulf Coast, and North Louisiana areas to Kentucky, Tennessee, Indiana, Ohio, and Pennsylvania. Both companies have been prepared for some time to start work as soon as the authorization was given. *(Details of Texas Eastern's work schedule are carried on page 111 of this issue.)*

Much Construction Involved

The authorization provides for a 723-mile, 26-in. line from Lisbon, La., gas field to a point near Middletown, Ohio; 110 miles of 20-in. line from Carthage, East Texas, gas field to Lisbon field; a 32-mile lateral in Indiana from Madisonville to Evansville, and 10 compressor stations with an initial capacity of 68,800 hp., to be built by Texas Gas at an estimated cost of $73,500,000; and 177 miles of 26-in. line from the Middletown terminus of the Lisbon line eastward; a 100-mile extension of the Little Big Inch line in Texas; 33 miles of loop near Beaumont, Tex., and 36 miles of loop between Castor and Lisbon, La., and additional compressor facilities to be constructed by Texas Eastern at a cost of $24,052,000.

The commission order calls on Texas Eastern to make up to 200,000 M.c.f. daily of gas available to Texas Gas at Lisbon, La., and on Texas Gas to make available to Texas Eastern at the Middletown, Ohio, connection 235,000 M.c.f. daily plus any amounts not delivered to Louisville Gas & Electric Co. during the first 2 years of operation of the facilities.

The FPC majority report concluded that the applicants had shown adequate gas reserves to support the service proposed, but in a lengthy dissenting opinion Commissioner Leland Olds took the contrary view and asserted the two companies made no better showing than had Tennessee Gas Transmission Co. in a recent case which was reopened for further study.

The second point at issue was that of financing, with Olds differing from the majority over the extent of commission authority in that field. The commission refused to impose a condition sought by Halsey, Stuart & Co. that Texas Gas be ordered to sell its bonds by competitive bidding. In a separate concurring opinion, Chairman Nelson Lee Smith held the commission had no legislative authority to assume jurisdiction over natural-gas security issues and finance but said he is prepared to join with the other commissioners in recommending to Congress that the FPC be given such power under the Natural Gas Act.

Commissioners Claude L. Draper and Thomas C. Buchanan did not participate in the case.

Court Holds Geophysical Crews Need No Permit From Owner of Surface

WHAT is believed to be the first legal case defining the respective rights of a geophysical prospector and the surface tenant of the property was decided recently by the District Court of the United States for the Western District of Texas at Pecos.

Amerada Petroleum Corp., Tulsa, was sued for $37,500 damages by Clint Shaw, a sheep rancher, who had leased the surface rights to 12 sections of land in Upton County. Amerada had a mineral lease from the owner, the Cowden Estate, and obtained a geophysical prospecting permit. Shaw claimed that since the permit was issued later than his surface lease was obtained the company had no right of entry on the land, but the company sent in its geophysical crews over his protest.

Shaw's suit alleged trespass, invasion of his right of quiet enjoyment of his surface lease, damage to his grass by tracks of the crews' vehicles, injury to a water well by near-by shooting, and damage to his sheep caused by dust, commotion, and the fact that the sheep followed the vehicles around the ranch. The jury awarded damages of $25 for the death of one sheep which fell into an unguarded shot hole.

There was no written opinion in the case, but attorneys believe the judge's charge to the jury will establish precedents. The judge stated that Amerada was not a trespasser because its permit from the mineral owner was sufficient right to enter the ranch and conduct necessary prospecting operations without the consent of the surface owner under a prior lease. He also said that the crews were not required to confine operations to established roads but that they must not cause unnecessary damage to the land or fences and must not leave shot holes unfilled. He charged the jury to award damages only for the direct and proximate result of negligence and not remote, contingent, or speculative damages, adding that the fact that sheep became exhausted from following the vehicles did not constitute negligence.

Because of the uncertainty as to their legal status, most oil companies have been paying surface owners a fixed rate for each shot hole drilled during geophysical prospecting. This is usually $10 per hole, but recently some surface tenants have been demanding as much as $50 per hole. In this case Amerada offered $10 per hole but Shaw demanded $35 per hole, which Amerada refused to pay.

New Louisiana Discovery Marks Offshore Activity

HOUSTON.—Recent activity in the offshore lands of both Texas and Louisiana was highlighted last week with the new discovery well brought in by Humble Oil & Refining Co. about 15 miles off Terrebonne Parish in the South Timbalier area, Block 36.

The well is the seventh field discovery well off the Louisiana coast.

Location for the third well to be drilled off the coast of Texas was revealed last week. Ohio Oil Co. is planning to drill the 1 State Tract No. 403 approximately 6 miles south from Brown Cedar Cut Matagorda Peninsula.

Stanolind Oil & Gas Co. is making ready to drill its 1 State Tract 24 off the Texas coast. To date a total of four dry holes have been completed off Texas' shores.

Texas Producers Fight Imports, Ask Congress to Investigate

by John W. Clote
Houston District Editor

HOUSTON.—A group of more than 500 of the Texas Independent Producers and Royalty Owners Association met last week in independent oil operator Glenn McCarthy's recently completed Shamrock Hotel and continued their fight to reduce oil imports.

Ernest O. Thompson, member of the Texas Railroad Commission, granting that operators have been burdened by the increase in imports of oil from foreign countries, explained that the commission has kept them from "drowning yourselves in your own oil."

Since January 1 the daily allowable has been reduced a total of 750,000 bbl. Even with all these cuts, we find the nation in ample supply of all oils and all oil products, he said. During January, Thompson explained, the United States was a net importer to the extent of 10,417,000 bbl. Imports, he reported, were on the increase while our oil exports have been decreasing.

"It is my opinion," he said, "from a survey on the ground, that the Middle East oil will supply Europe in the future and we here at home are going to have to be content with our own markets in North and South America."

Committee Selected

The organization passed a resolution that the select committee on small business of the House of Representatives of the U. S. Congress be requested to hold a hearing or hearings in Texas in the immediate future in order that the plight of the independent producer and royalty owner and the relationship of their plight with national security and public interest be factually determined.

Restriction of imports, although the major theme throughout the meeting, was not the only concern of the industry as was brought out by Walter S. Hallanan, chairman of the National Petroleum Council and president of Plymouth Oil Co.

The time has come "for all America to stand up and fight against the assault now being made against the system of private enterprise, of which the petroleum industry is an outstanding symbol," Hallanan said. The way to stop this "creeping paralysis of paternalism" is for the whole country to stand up and fight the way Texas is fighting, he said.

Hallanan pointed to the record of the independent producers that out of every 100 wells drilled in 1948, 73 were drilled by independent operators. This fact, he said, is a "glowing tribute to the courage and vision of the small independent operator."

Attacking the so-called "welfare state" program sponsored by the national administration, he said that it was "the most reactionary measure ever presented to the American Congress. If enacted into law, it would set the clock back more than 150 years."

Bringing out that some gas companies make a hidden profit by virtue of "purchasing gas upon one basis and selling it on another," Guy I. Warren, president of T.I.P.R.O., emphasized the need for a law to provide for the producer and royalty owner a standard basis for measurement of natural gas. He pointed out such a bill is now pending in the Texas Legislature.

Regarding legislation providing for the fixing of gas prices, Warren asked the group "to think carefully and try to arrive at a long-range viewpoint. If the State of Texas and other states fix the price of gas sold within their borders, then the federal Government certainly will follow suit and fix the price of gas produced for interstate shipment."

Commenting on the import situation, Warren said that the income from many producing properties in Texas has been cut as much as one-third in the last 3 or 4 months. Import capacity, he said, will be increased by thousands of barrels per day because importers are being allocated steel for pipe lines and tankers.

"We know that the importing companies have spent billions in the development of a foreign crude supply and we all want them to retrieve their investments and reap their reward therefrom, but we must not endanger the very security of our nation by allowing cheaply produced foreign crude oil to disrupt the domestic search for oil," Warren pointed out.

Addressing the delegates Friday, U. S. Rep. Kenneth M. Regan, from Midland County, Texas, declared that "it may well be definitely in the national interest to make specific legislative provisions restricting imports when domestic exploration and production of oil is impeded thereby."

Guy I. Warren, president of T.I.P.R.O., was reelected at the group's business session Friday afternoon as were the other officers: W. T. Beard, Jr., San Antonio, treasurer; A. R. McElreath, Fort Worth, secretary; and E. I. Thompson, Austin, executive vice president.

Vice presidents who will compose the executive committee for the coming year are: L. A. Douglas, San Antonio, District 1; J. P. Pool, Jr., Victoria, District 2; Vernon W. Frost, Houston, District 3; V. F. Neuhaus, Mission, District 4; Bert Fields, Dallas, District 5; E. A. Allison, District 6; V. C. Perini, Jr., Abilene, District 7-B; Kenneth W. Brown, San Angelo, District 7-C; E. G. Rodman, District 8; A. R. Dillard, Wichita Falls, District 9; and Cecil O'Brien, Amarillo, District 10.

Taking time out for some relaxation during T.I.P.R.O. meeting, are Vernon W. Frost, Houston (at the piano) and left to right: W. J. Goldston and Elmer Patman, Houston; Guy I. Warren, Corpus Christi; Kenneth M. Regan, Midland, and Ralph A. Johnston, Houston

Thompson Forecasts Stricter Texas Conservation Measures

SAN ANTONIO.—The Texas Railroad Commission intends to use its authority to the fullest to enforce conservation, protect a reserve producing capacity by use of market-demand proration, and spread the market along all types of crude and producing areas, the Western Petroleum Refiners Association was told here last week by Commissioner Ernest O. Thompson.

Referring specifically to West Texas sour crude, the demand for which is falling off, Thompson said that the commission does not intend to let this area suffer from cutbacks in allowables to any greater extent than other parts of Texas. Buyers of crude, he said, "will have to take the sour with the sweet," and refiners should continue to plan installation of equipment to handle crude of high-sulfur content in spite of the fact that there may be capacity to produce sufficient sweet crude for their current needs.

Intimating that the commission will attempt to keep production tailored to market demand in order to prevent depressing surpluses of crude, Thompson said that price should be an ally of conservation rather than a threat to it.

Predicts Court Support

In reviewing the recent record of the petroleum industry, Thompson reminded W.P.R.A. members that the commission was required by law to effect conservation of oil and gas and that production in excess of demand was deemed waste by Texas statutes. He discussed with gratification the court decisions which have upheld the commission in shutting in fields where casing-head gas was being wasted and pointed to the growing judicial intimation that the commission would be found remiss in failing to pursue an aggressive show-cause and shut-in policy where evidence indicated waste whether or not conservation of casing-head gas is considered commercially economical.

Regarding proration adjustments of the last several months, he repeated that the commission would follow a strict policy of adjusting allowables across the board without geographical discrimination. He pointed to the fact that Texas production will be cut a greater amount in April than current additions to storage.

As to the coming MER hearings this month, Thompson intimated that all concerned may have been a little optimistic in past years regarding the efficient producing capabilities of some fields. Reminding listeners that MER meant most efficient rate, not maximum efficient rate of production, he stated that in coming studies of field capacities the commission would tend to err on the conservative side if at all.

The commissioner expressed the belief that importing companies who have brought large volumes of crude to this country this winter were following through on prior commitments made early last year when shortage threatened. He echoed the opinion that imports are now declining and further reductions will continue this year as importers follow their avowed policy of employing imports only to augment domestic production as needed.

He severely criticised the false prophets of shortage who continue to advocate greater federal control and enormous government expenditure for synthetic-fuel production. This criticism he supported by quoting the record of increasing reserves of both domestic oil and gas during record consumption periods.

Stanolind's Wild Gas Well At Lac la Biche Is Killed

Stanolind Oil & Gas Co. announced April 4 that it has killed its wild gas well in Alberta, Canada, 1 Lac la Biche, with a relief well drilled 350 ft. away.

The well was a stratigraphic test and hit a heavy gas flow at 810 ft. which went out of control for 2 days. Surface casing was cemented at 467 ft. as a safety measure and drilling continued to 1,586 ft. on March 9 when circulation was lost in a porous formation, and with no mud control the gas from the higher stratum broke loose again. There was no fire, but a crater 60 ft. in diameter developed into which dropped the derrick and draw works.

Payroll Savings Plan for Oil Industry Is Endorsed

The "Opportunity Drive" in the petroleum industry covering the Payroll Savings program for United States bonds presents a real opportunity for management, W. T. Payne, drilling contractor and oil operator of Oklahoma City, emphasized to more than 60 oil-company executives at a dinner in Tulsa March 31.

Payne, who is chairman of the Oklahoma Payroll Savings Committee, said that the drive, which will be carried on in the oil industry April 18 to May 14, will "strike an effective blow against Communism and deliver aid to our own system" and "help insure the dignity of the individual and his rights and privileges as a citizen." The program has been approved by the National Petroleum Council and the board of directors of the American Petroleum Institute.

Martin Miller, assistant director, Payroll Savings Section, Treasury Department, outlined the national program and the plans to hold additional oil meetings next week at Houston and Dallas, and later at San Francisco and Los Angeles. A similar meeting, under the sponsorship of Gen. James H. Doolittle, vice president of Shell Union Oil Corp., was held in New York City last week. *(The Oil and Gas Journal, March 31, page 66).*

Oklahomans Sponsor Bill To Limit FPC Gas Powers

WASHINGTON.—Legislation to deprive the Federal Power Commission of all jurisdiction over independent producers and gatherers of natural gas who sell to interstate pipe lines was introduced in the Senate this week by Senators Robert S. Kerr and Elmer Thomas of Oklahoma.

Kerr explained the bill was introduced pursuant to a resolution adopted by the Oklahoma Legislature March 17, but declared that, aside from the action of the legislature, "no one has any question but that the intent of Congress when it passed the Natural Gas Act in 1938 was to exclude independent producers and gatherers of natural gas from Federal Power Commission jurisdiction."

The senator pointed out, however, that the Supreme Court has construed the law to confer jurisdiction over producers and gatherers, and there is need for clarification of the point by Congress.

The bill was introduced in the Senate as the House interstate commerce oil subcommittee, under Rep. Oren Harris of Arkansas, prepared to open hearings on similar legislation at which a number of oil and gas producers will testify.

Lease Deadline Named By Louisiana Mineral Board

BATON ROUGE.—The Louisiana Mineral Board has set April 15 as the deadline for accepting applications for both offshore and inland tracts offered at the lease sale scheduled May 26.

The board will hold its routine business meeting April 21 when it will consider unitizations, assignments, amendments, and other such matters. The last day that these instruments will be accepted for consideration at the meeting is April 1[illegible]

this week

CONSERVATION—Texas Railroad Commissioners keep warning producers of stricter rules to come. . . . ¶MER hearing this month considered extremely important. . . . May result in further drastic cuts in allowables. . . . ¶Commission appears determined to protect price by market-demand proration. . . . ¶All Texas areas assured of equal treatment in future cutbacks. . . .

SULFUR—Handling sour crudes looms as the biggest problem facing refiners in next few years. . . . ¶Industry spending $125,000,000 for sulfur-removal equipment. . . . ¶Texas commissioner says ratable take will be applied to keep West Texas sour crude on the market. . . . ¶Large supplies of foreign crude now entering world market, particularly for European refineries, are high in sulfur and require special handling. . . . ¶Comprehensive A.P.I. sulfur research program making progress with assistance of A.C.S. . . .

RESEARCH—Refiners turning even more to research as key to progress and problems of the future. . . . ¶With capacity now reasonably adequate, most pressing problems are improved product quality, conversion of heavy fractions to more profitable products, and treatment of sour crudes. . . . ¶Microchemistry lauded as neglected tool of great value in refinery work. . . .

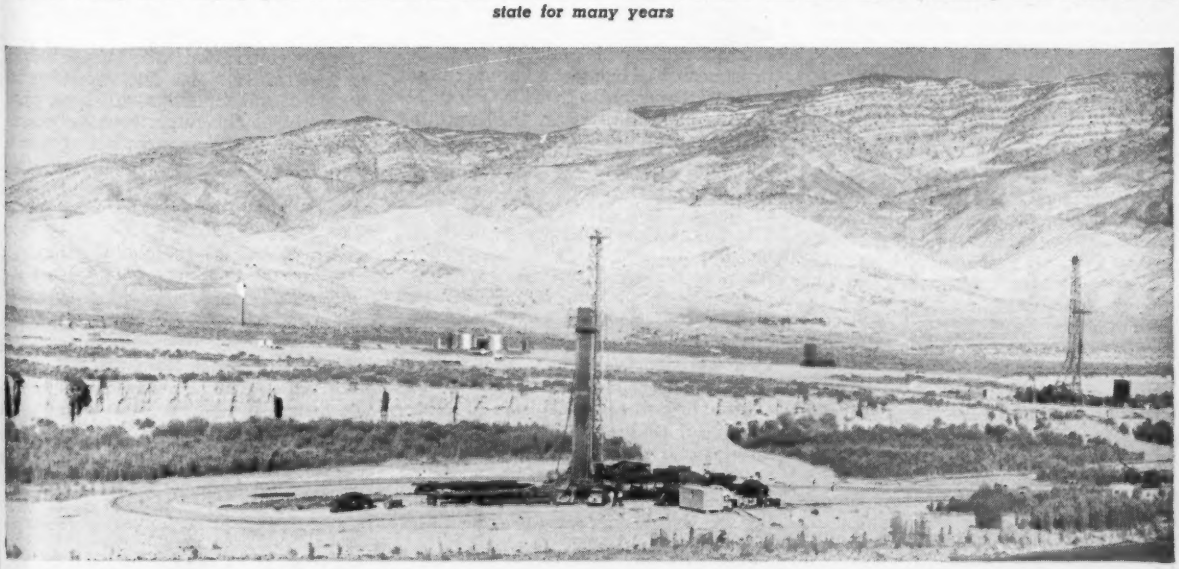
INTERNATIONAL—Review of 1948 Middle East discoveries and exploration in progress points to further increases in output. . . . ¶Number of rotary drilling rigs now operating abroad slightly under December figure. . . . ¶Australia's only oil field finds horizontal drilling successful. . . . ¶American Independent group forms new Mexican subsidiary to handle Pemex drilling contract. . . . U. S. Government noncommital on Pemex oil loan. . . . ¶Venezuela prepares to formulate a definite oil policy. . . . ¶First lube plant for Middle East going up at Abadan.

GOVERNMENT—Congress begins work on legislation to limit control of Federal Power Commission over natural-gas producers. . . . As FPC reveals serious split over policy toward adequate gas reserves for transmission lines. . . . And its jurisdiction over gas-company finances. . . . ¶RFC finally announces plan for disposal to private industry of synthetic-rubber facilities. . . .

PIPE LINES—FPC authorizes $97,500,000 construction program jointly by Texas Gas Transmission Corp. and Texas Eastern Transmission Corp. . . . Systems will be interlinked to take more gas from Southwest to Appalachian area. . . .

TRENDS—Daily average crude-oil production in U. S. for week ended April 2 was down 51,625 bbl. from the previous week or 310,000 bbl. under the same week last year and 589,000 bbl. under record week of last November. . . . ¶Changes in refinery operation since last year are indicated by shifts in output. . . . Refinery runs for 4 weeks ended March 26 were up 1.3 per cent over same period last year. . . . Refinery production of gasoline was up 11.4 per cent. . . . Kerosine production was down 20 per cent, distillate production was down 10 per cent, and residual production was down 6.9 per cent. . . . ¶Pennsylvania Grade crude gets fifth price cut in less than 4 months. . . . Heavy-fuel and heavy-crude prices reduced in California. . . . Gasoline prices were up 1/2 cent per gallon in New York and New England. . . .

This picture was described as a beautiful scene by Stansbury, Inc., drilling contractor of Bakersfield, Calif., whose rig in the foreground is drilling for Richfield Oil Corp. in the Cuyama Valley. The barren hills and sagebrush may not look beautiful to Easterners, but Cuyama Valley looks mighty good to California oil men as it is the newest, richest, and most active producing area found in that state for many years



Sulfur and Microchemistry Are Chief Topics of Oil Chemists

AN extensive symposium on sulfur in petroleum was the outstanding feature of the Division of Petroleum Chemistry of the American Chemical Society which met in San Francisco March 27 to April 1.

The oil industry is now spending more than $125,000,000 in equipment to remove sulfur compounds from the products of sour crudes coming from both foreign and domestic sources, Dr. Wayne E. Kuhn, chairman of the division and manager of the technical and research division of The Texas Co., said in opening the 2-day symposium.

Pointing out that sulfur removal materially boosts refining costs, Kuhn said these costs have been absorbed by the manufacturer and have not increased prices, which he described as a tribute to the industry's technologists. It may involve an expenditure of $7,000,000 to install equipment to handle sour crude in a refinery with a capacity of 50,000 bbl. per day, he said.

A.P.I. Started Project

Many of the 28 technical papers in the sulfur symposium were part of the research project on this subject authorized last year by the American Petroleum Institute. The chairman of the A.P.I. advisory committee, W. D. Seyfried of Humble Oil & Refining Co., described the project as directed primarily toward the identification and measurement of sulfur compounds in typical crude oils and to the development of tools for effectively accomplishing this purpose. Of almost equal importance is the development of fundamental information on physical and thermodynamic properties on pure sulfur compounds.

Processes such as doctor sweetening which convert sulfur compounds from one form to a less objectionable form do not necessarily solve all problems of corrosion, bad odor, octane number, lead susceptibility, and product stability, Seyfried said. On the other hand, processes that effect the complete removal of sulfur compounds may cause substantial yield losses even for crude oils of only moderately high sulfur content, he added, especially when it is considered that a crude oil containing 5 weight per cent of atomic sulfur may contain as much as 40 per cent of sulfur compounds.

Seyfried referred to the increasing volumes of both domestic and foreign crudes which contain sufficient sulfur to be troublesome and declared: "It is apparent that a great deal of fundamental information is still lacking.

"For instance, not only is there considerable disagreement as to the types of sulfur compounds that may occur in crude oils or in straightrun distillates, but there is also some question as to whether the compounds that occur in the lighter boiling-range fractions were present in the original crude or were produced by thermal decomposition of heavier compounds. Unless fundamental data are made available, progress on the handling of such compounds in refining operations will be hampered to a considerable extent."

Most of the papers in this sulfur symposium dealt with analytical methods or other technical aspects of the A.P.I. project.

Of a less technical nature were two papers by L. Kermit Herndon of Ohio State University, who described plants built by Southern Acid & Sulphur Co. to recover elemental sulfur from refinery and natural gases and to obtain sulfur from refinery acid sludge.

A second symposium on microchemistry in the petroleum industry presented 21 papers on various aspects of this subject.

Micro Methods Praised

"Few people in the petroleum industry who are not involved in laboratory work fully appreciate the fact that they are witnessing a scientific revolution in the analytical field," it was declared in an introductory paper by J. B. Rather and associates of Socony-Vacuum Laboratories, Flushing, N. Y.

"To meet the current problems of refinery control, petroleum laboratories have found it necessary to utilize all available methods of analysis. Microchemistry is one of the approaches which management cannot afford to overlook. It offers many attractive possibilities in the handling of many broad problems."

A similar view was expressed in a paper by Harry Levin and associates of the Beacon, N. Y., laboratories of The Texas Co. "Activity in, and utilization of, this field of analysis in the petroleum industry has been sluggish indeed," it was declared. The authors listed a large number of uses of microchemistry in petroleum analysis and concluded that the method is superior for many applications because very small quantities of materials are used and the apparatus is not expensive.

Other papers in this series described microchemical methods for determining the knock characteristics of motor fuels; for detecting the amounts of chlorine, nitrogen, sulfur, oxygen, metals, and other substances in petroleum; and similar applications in refineries.

Permian Producers Warned To Improve Conservation

ODESSA.—With the blunt statement that West Texas has the lowest recovery percentage record of any oil-producing area in the state, William J. Murray, Jr., chairman of the Texas Railroad Commsision, told the Permian Basin Chapter of the American Petroleum Institute that proven methods of conservative production must be observed and constant attention given to developing new ways of conservation.

West Texas is the most richly endowed mineral area of the world, Murray said, but no nation can survive if it is heedless of waste of natural resources, and careful conservation practices are vital to proper development. Proper utilization of natural gas and petroleum will bring about a big program of industrialization for the area, he predicted.

Indicating that the commission will use its regulatory powers both to force conservation in West Texas and to assist producers there by the way in which it administers its allocation and other regulations, Murray was optimistic about the future outlook for West Texas producers.

Industry Problems to Be Heard at N.P.A. Meeting

Various problems of the petroleum industry, including those on taxation, pricing, and wages, will be discussed at the forty-sixth semiannual meeting of National Petroleum Association in Cleveland April 13-15.

Meeting at Hotel Cleveland, the association will devote considerable time to committee meetings, as well as general sessions. Included in the departmental meetings will be a joint assembly of the department of manufacture and the department of standards and tests, which will be held April 15. Among papers to be given at this, and other department meetings, are the following:

April 14: "Petroleum Supply and Demand—Review and Outlook," by Richard J. Gonzales, economist, Humble Oil & Refining Co.

April 15: "Automobile Crankcase Oils," by H. C. Mougey, technical director, research laboratories division, General Motors Corp.; "Modern Research in the Oil Industry," by Dr. Gustav Egloff, Universal Oil Products Co.; "Anti-Detonant Injection and the Petroleum Industry," by C. H. Van Hartesveldt, vice president, Thompson Vita-Meter Corp.; "Round Table Discussion of Current Wage and Manpower Surveys of Petroleum Industry," led by R. K. Hoitsma, Standard Oil Co. (Ohio) and C. R. Winegarden, Bureau of Labor Statistics.

Refiners at A.P.I. Meeting See Research as Key to Progress

by George Weber
Refining Editor

HOUSTON.—The nation's refiners in Houston this week for the fourteenth midyear meeting of the American Petroleum Institute Division of Refining took a progressive forward look at problems of refining next year and of the next generation.

The record of the past, well known to the industry, was reviewed briefly with one express desire that the general public be made more cognizant of the outstanding job done this past year by refiners and the industry as a whole.

Chester F. Smith, vice president of Standard Oil Co. (N. J.) and the Institute's vice president for refining, sounded the dominant trend of thinking in his address on the future of oil refining at the meeting's open dinner session. With more than a million barrels of new refining capacity added since the war and an end to the need for stretching plant runs beyond their design capacities, refiners are devoting their attention to the changing pattern of product demand. Not only are they preparing to supply a probable record gasoline market this year but technical research is going forward to afford the conversion of heavy-fuel fractions to better use over the next decade, Smith said.

Looks to Future

Looking even further into the future, active preparation is under way for the eventual conversion to other sources than petroleum for liquid fuels. These broad concepts shared attention at the meeting with a few of the many specific subdivisions of refining technique.

Opening sessions of the meeting concerned four such topics: analysis, training, corrosion, and vapor lock. A continuation of the A.P.I.'s comprehensive symposium of rapid methods of analysis required two technical sessions.

Reports on new techniques in the determination of furfural in lube oils, dyes in aviation gasoline, aromatics in oil fractions, oil in waxes, and carbon and iron in catalysts, illustrate the complexity of modern refining research and the need for speeding control-testing in busy refinery laboratories. Spectroscopy, an expanding qualitative and quantitative tool, was discussed in its many uses.

One paper in the symposium described apparatus procedure for carrying out three common inspection tests for specific gravity, viscosity, and Engler distillation on micro scale on samples ranging from 0.03 to 3.00 ml.

All phases of employe training were covered in a session on that subject. A distinct challenge to the industry was revealed in the report of a survey on refinery training practices conducted for the A.P.I. by the University of Texas last year.

This first analysis of its kind surprised many who assumed that training in the refinery industry had reached an advanced state. While refinery training has rapidly expanded since the war in contrast to declining programs in many other industries, organized projects in the medium and smaller plants were found to be far fewer than might be expected.

A few of the extensive current studies on corrosion were discussed. A survey of both high alloy and the less expensive low-alloy steels suitable for use in high-pressure, high-temperature service in the presence of hydrogen contributed an important reference work for designers concerned with the hydrogenation process.

Cathodic protection, an established method of corrosion control in oil fields and pipe lines, was reported practical and economical on bare pipeline networks and tank bottoms in refineries. Corrosion failures in bellows-type piping expansion joints used in fluid catalytic cracking plants was the subject of a third paper in the symposium. The importance of close technical collaboration with automotive engineers was recognized in a group session on vapor lock. A report on that subject from the automotive industry indicated that operating temperatures of automotive engines will continue to be relatively high.

Three Technologists Given Honors At Houston A.P.I. Meeting

HOUSTON.—Three petroleum technologists were honored here this week by the Division of Refining, American Petroleum Institute, in "recognition of their many contributions to the advancement of petroleum arts and sciences."

WALTER SAMANS

K. G. MACKENZIE

T. G. DELBRIDGE

The three, who received "Certificate of Appreciation" honors were Thomas G. Delbridge, Atlantic Refining Co., Philadelphia, retired; Kenneth G. Mackenzie, The Texas Co., New York City; and Walter Samans, Sun Oil Co., Philadelphia. Presentation of the certificates was made April 6 at an open dinner meeting by John W. Newton, vice president, Magnolia Petroleum Corp., Beaumont, Tex., and vice chairman of the general committee. Dr. Delbridge was unable to attend the Houston meeting, and his award was forwarded to him.

Delbridge has been affiliated with the refining industry since 1909, when he joined Atlantic Refining as chief chemist of the control laboratory. He remained in that position until 1922, at which time he was made assistant plant manager of the company's Philadelphia refinery. In 1935 he was named manager of the research and development department and held that position until retirement in 1947.

Mackenzie has become widely known in oil industry and chemical circles during the past 41 years through his outstanding work in organizing and directing continuous efforts to standardize testing procedures and criteria. He took his first job in the petroleum industry in 1908, and in 1911 joined The Texas Co. He has been with the firm since that time.

Samans, native of Holland, was educated at University of Pennsylvania. Later he joined Atlantic Refining Co. as design engineer and field-construction supervisor, and then went with Sun Oil Co. as mechanical and administrative engineer in 1937.

International

WORLD-WIDE OIL DEVELOPMENTS

Middle East Operations Point To Further Increase in Output

IRAQ PETROLEUM CO., LTD., and two affiliated companies drilled more than 60,000 ft. of hole last year in Iraq, continued extensive geophysical and geological investigations, and found what appears to be a new commercial field in the southern part of the country.

I.P.C.'s production at its principal field, Kirkuk, averaged slightly more than 65,000 bbl. daily during the year. In addition, about 7,900 bbl. daily was produced at Naft Khaneh, southeast of Kirkuk. Kirkuk's output was limited to pipe-line capacity, and one leg of the Mediterranean line was closed most of the year because of the Palestine-Arab fighting.

The indications of a new field were in a well drilled in the District of Basrah on the concession of the affiliated Basrah Petroleum Co., Ltd. A second well had encouraging oil shows. Drilling is continuing to lower horizons.

Basrah Production Confirmed

The evidence of the first commercial production in the Bahrah District was confirmed in the discussion of petroleum developments in Iraq given by N. E. Baker, chief I.P.C. geologist, at the recent San Francisco meeting of the American Institute of Mining and Metallurgical Engineers. The well is the Zubair wildcat about 20 miles southwest of the city of Basrah. It showed a potential of 3,500 bbl. daily on ¾-in. choke in testing at 7,775 ft. *(The Oil and Gas Journal, November 25, page 62).*

I.P.C. geophysical parties have found numerous gravity anomalies in southern Iraq west of Basrah. These were confirmed in subsequent work with the seismograph. Magnetometer work also has been carried out in the area.

West of Baghdad, gravity meter and magnetometer operations were conducted with seismograph work under way in this section at the end of the year. In the Kurdish Mountains of Northern Iraq, stratigraphic studies were being made, and a geological exploratory well was started on the Mushorah Dagh structure in northwestern Iraq near the Syrian-Turkish-Iraq frontier, according to Baker.

In Kirkuk, one additional well was placed on production during the year, bringing the total to 22 along with 11 observation wells. Ain Zalah in the northern area is reported in a semi-exploratory state, and at Bai Hassan, a gas well was completed last year at a depth of 2,667 ft.

Lali Now Producing

Among petroleum developments of interest in Iran in 1948 was the fact that Lali field, northwest of Masjid-i-Sulaiman field, was placed on a production basis with an output averaging about 8,100 bbl. daily during the year. Lali was discovered in 1946 and is the newest Iranian producing area.

Of a total Iranian production in 1948 of 190,395,000 bbl.—using estimates for November and December—75,795,000 bbl. came from Haft Kel where there were no developments of special interest last year, according to B. R. Jackson, Anglo-Iranian Oil Co., Ltd., official who prepared this summary for the A.I.M.E. gathering.

At Agha Jari, the Anglo-Iranian company steadily increased the rate of production until by the end of the year this field's production equaled that from Haft Kel. The year's total production from Agha Jari was 68,664,000 bbl. This spring, A.I.O.C. expects to place in operation a new 20 and 22-in. pipe line to carry crude to tanker-loading facilities at Bandar Mashur. Three new producers were completed last year in Agha Jari.

The third major Iranian producing area is Masjid-i-Sulaiman with a 1948 production of 25,750,000 bbl. No new wells were drilled in the field since existing wells were found adequate for maintenance of production. Recycling of products to the reservoir, a procedure which varies with market conditions, has not been carried out to any appreciable extent.

At Naft Safid, an additional producer, located some 12 miles from the nearest oil well, was brought in at a depth closely corresponding with that previously estimated from geological and geophysical evidence.

In Northwest Iran, production in Naft-i-Shah field met local market requirements with the policy of recycling surplus products to the reservoir continuing, according to Jackson. Total sulfur recovery last year by the company was 16,000 tons of which 12,700 tons were from plants at Masjid-i-Sulaiman and 3,300 tons at Abadan.

Passage of the Mines and Quarries Law and the discovery of the new producing areas of Asl and Matarma were the outstanding developments last year in Egypt, according to R. P. Walters, Standard Oil Co. (N. J.), who prepared another of the summaries. Daily average production in Egypt's three producing fields last year was: Ras Gharib 25,400 bbl.; Hurghada 900 bbl.; and Sudr 9,500 bbl.

Asl's production is mostly from Eocene limestone beneath the Miocene unconformity and therefore similar to Sudr *(The Oil and Gas Journal, February 24, page 98, and March 3, page 44)*. In a second well in this field, however, a sand approximately 1,000 ft. above the base of the Miocene tested 14°-gravity oil. Matarma produces from a sand in the Miocene which may correspond to the sand tested in the second well in Asl. In Sudr, a well on the north found oil sands in the Miocene corresponding to the productive interval at Matarma, but no tests have been made, Walters reported.

Kuwait Output Rises

Crude-oil production in the Persian Gulf Shiekdom of Kuwait in February showed another sharp increase to reach a daily average of approximately 256,700 bbl. daily. Kuwait Oil Co., Ltd., reported a total for the month of 971,369 tons, an increase of 88,938 tons over the previous month.

Slight Decline Shown in Report On Rotary Rigs Running Abroad

DRILLING operations in foreign areas, as indicated by the number of rotary rigs running, have shown a minor decline in recent months.

A tabulation of operating rigs outside the United States shows a total of 457 in March. This is 31 less than the number reported for the same foreign areas in December 1948. The change is a decrease of about 6.5 per cent.

Most of the drop in the number of rigs running is reported for South America and particularly Venezuela. The total for South America was down from 301 in December to 279 in March. Venezuela, which accounts for about a third of all foreign rigs, declined from 151 in December to 138 in March.

Much of the decrease in the total of rigs running apparently is the result of the more ample crude-oil supply position of the petroleum industry world-wide. Venezuelan producers are reported to be retiring less efficient equipment, cutting back to some extent on drilling programs, and concentrating on lighter-grade oil. Considerable Venezuelan production of the heavy fuel-oil type has been shut in recently because of saturated market conditions.

Three Areas Drop

Reductions in the total of rigs operating are noted in all three major areas in Venezuela (see accompanying table). Smaller reductions in the total of rigs operating are listed for several other South American countries, a decline from 26 to 24 rigs in Colombia for example.

Elsewhere throughout the world, in Europe, Africa, the Middle East, and the Far East, rigs operating in various countries generally were either unchanged or down slightly from the total reported in December. Forty-nine rigs are listed for the Middle East and Egypt in March as compared to 50 in December. In the Far East, the total is 38 in March against 42 in December.

Even recognizing the constant minor changes taking place in the number of operating rigs, the tabulation indicates an over-all drop in the rate of foreign drilling. It points to exploration and development drilling at a less frantic pace than that which characterized the first 3 postwar years.

The figures do not include Russia and Eastern Europe for which no accurate information is available. Canadian rigs running are carried in reports for the United States. Germany also is omitted from the table because of a lack of definite information.

FOREIGN ROTARY RIGS OPERATING

Country—	Dec. 1948	Mar. 1949
NORTH AMERICA (Excluding United States and Canada)		
Alaska	2	2
Cuba	1	1
Mexico	38	37
Panama	1	1
Total North America	42	41
SOUTH AMERICA		
Argentina	58	50
Bolivia	2	2
Brazil	5	5
Chile	3	4
Colombia	26	24
Ecuador	11	11
Paraguay	2	2
Peru	20	21
Trinidad	23	22
Venezuela	151	138
Eastern Venezuela	76	67
Central Venezuela	7	5
Western Venezuela	68	66
Total South America	301	279
EUROPE (Excluding Russia, Eastern Europe and Germany)		
England	9	9
Denmark	2	2
France	15	12
Italy	7	7
Netherlands	6	6
Spain	3	3
Total Europe	42	39
AFRICA (Excluding Egypt)		
Algeria	2	2
French Equitorial Africa	1	1
Morocco	6	6
Tunisia	2	2
Total Africa	11	11
MIDDLE EAST (Including Egypt)		
Bahrein	2	2
Egypt	8	8
Iran	9	9
Iraq	6	6
Kuwait	8	9
Qatar	2	2
Saudi Arabia	9	7
Lebanon	1	1
Syria	3	3
Turkey	2	2
Total Middle East	50	49
FAR EAST		
Australia	2	2
China	4	3
Burma	2	2
East Indies	16	15
Philippines	1	1
India-Pakistan	12	12
New Guinea	5	3
Total Far East	42	38
Total foreign	488	457

International

Company Formed for Pemex Drilling Contract

WASHINGTON. — Formation under the laws of Mexico of a wholly owned subsidiary to handle the contracts entered into with Petroleos Mexicanos last month was announced this week by Ralph K. Davies, president of American Independent Oil Co.

The new company will be known as American Independent Oil Co. de Mexico, S.A., and will have an initial capitalization of 7,000,000 pesos (approximately $1,000,000). Davies will be president, with N. P. Isenberger, vice president of American Independent, as vice president, and Chandler Ide as secretary-treasurer. These three, with Raymond W. Ickes, son of former Secretary of the Interior Harold L. Ickes, will comprise the board of directors.

Replaces Earlier Company

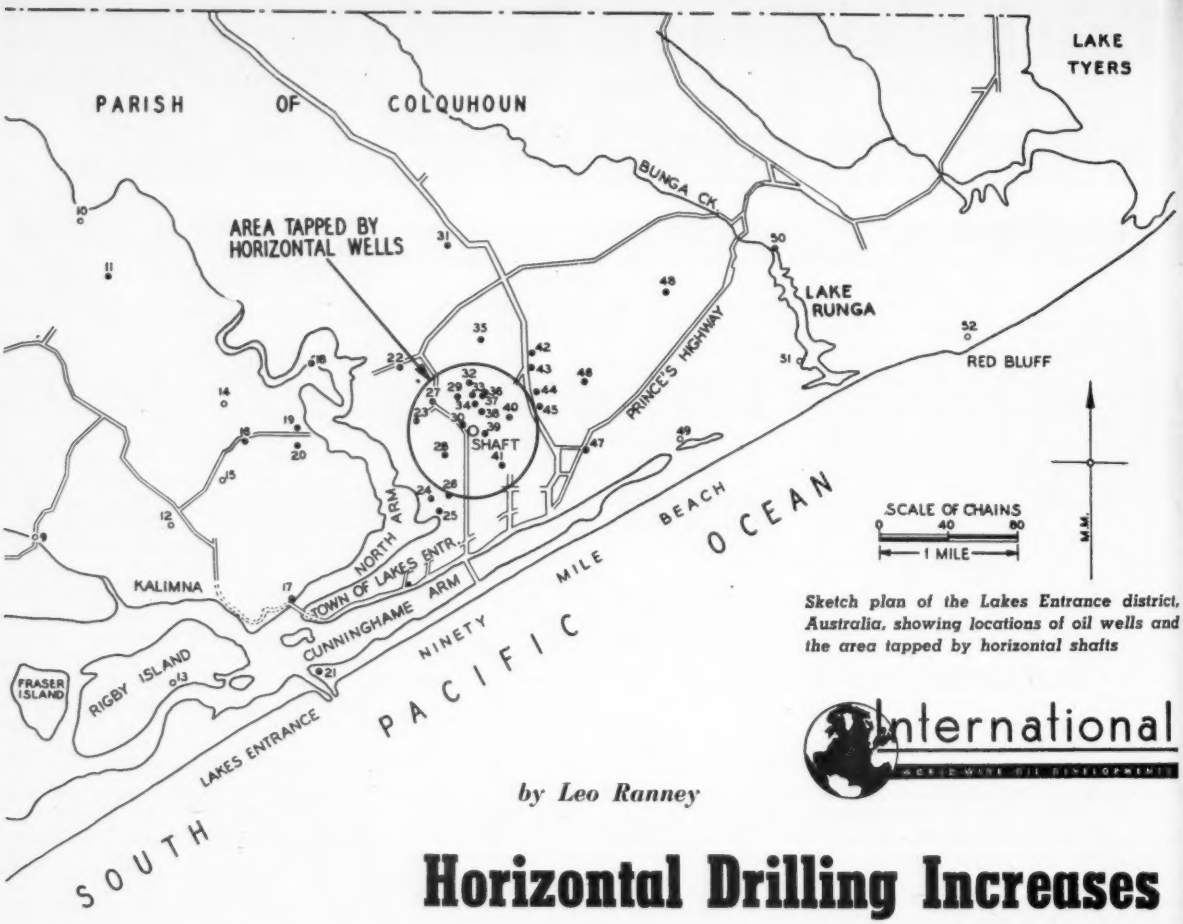
The new Mexican subsidiary will replace the Mexican American Independent Co., which it was announced last month would be formed to carry out the contracts entered into by Davies; Edwin W. Pauley, Los Angeles producer; and Samuel B. Mosher, president of Signal Oil & Gas Co.

The contracts provide for the development of a number of fields on the Gulf Coast side of the Isthmus of Tehuantepec in southeastern Mexico and under the adjoining gulf waters, an area, Davies said which is "highly promising from a petroleum standpoint."

"The contracts provide the basis for a mutually profitable operation from which the Mexican Government and the contracting group should realize substantial benefits," Davies added.

Under the contracts, the company is to proceed immediately with development work on three structures, with seven others to be worked later. It will be compensated for all costs and expenses approved by Pemex out of 50 per cent of the production from wells drilled by it and in addition will receive amounts ranging from 15 per cent of the production from the uplands to 18¼ per cent from submerged lands over the 25-year life of the agreements.

American Independent Oil Co. is itself composed of 10 independent American operators who in 1947 joined forces to enter the international field.



Sketch plan of the Lakes Entrance district, Australia, showing locations of oil wells and the area tapped by horizontal shafts

International

Horizontal Drilling Increases Yield of Australian Oil Field

by Leo Ranney

AUSTRALIA has only one oil field, Lakes Entrance field, about 200 miles east of Melbourne, counties of Tanjil and Tambo, near the town of Lakes Entrance on Ninety Mile beach. It is the first field in the world where primary production is being developed by horizontal drilling.

The first vertical well in this field was drilled in 1924, and up to 1941 some 44 wells had been put down within an area of 15 sq. miles. Of these, 36 had a show of oil and 28 were drilled within a stretch of 2½ miles. Production of oil varied from 4.9 to 110 imperial gallons daily. The limits of the field have not been defined. It may extend under the ocean for a considerable distance.

The structure is a monocline, the producing rock, found at 1,200 ft., being about 35 ft. of glauconite sandstone underlain by an unconsolidated sand bearing fresh water. Basement rock is found at 1,300 ft. Above the glauconite are strata of micaceous marls, limestone bands, and soft sandstones to the surface.

The producing glauconite has a porosity of about 20 per cent and contains numerous lenses of bitumen varying in thickness up to 2 in. The sand grains are very fine, which accounts for past low production, since the oil is of 17° A.P.I. and contains no gasoline or kerosine. Neither gas nor sulfur is found in the oil, which shows about 70 per cent lubricating content. Estimated oil content of the sand is from 12,000 to 20,000 bbl. per acre. The oil is now being sold for about $5 per barrel.

During the late war the writer and Charles O. Fairbank were engaged by the Commonwealth Government to make a survey of the field and recommend a plan of development. Their recommendation was a concrete shaft 10 ft. in inside diameter, 1,200 ft. deep, with a concrete work chamber 20 ft. in diameter resting on the glauconite at the bottom of the shaft. From this work chamber 24 horizontal wells would be drilled, curving downward to the proper substratum of the glauconite, then leveling off and being drilled to a length of 3,000 to 4,000 ft. The holes will be open, 4 in. in diameter and cased at the mouth with 100 ft. of 6-in. casing, firmly grouted in. Only one large pump will be required to pump all the wells. Casing required will be less than 10 per cent of the length of exposed sand.

The shaft was completed as the shooting war ended, and the Commonwealth Government returned the property to the former owner, Lakes Oil, Ltd., a privately financed corporation, which has built the work chamber and is now testing the glauconite to find the best level to be tapped by the horizontal wells. The test probes are diamond-drill holes 1½ in. in diameter. Several of these have been drilled, the longest being 200 ft. long.

These holes of less than 2 in. in diameter were not meant to be producing wells. However, they have turned out to be such and are producing oil by natural flow to tanks in the work chamber. Present rate of flow varies from 25 to 30 bbl. of oil daily. When drilling has been completed the wells from this shaft will drain more than 400 acres—in fact, it would be practical to extend the horizontal wells to tap 1,000 acres. A horizontal drilling machine had to be designed for this purpose.

An interesting feature of this development is its demonstration of what may be expected when hori-

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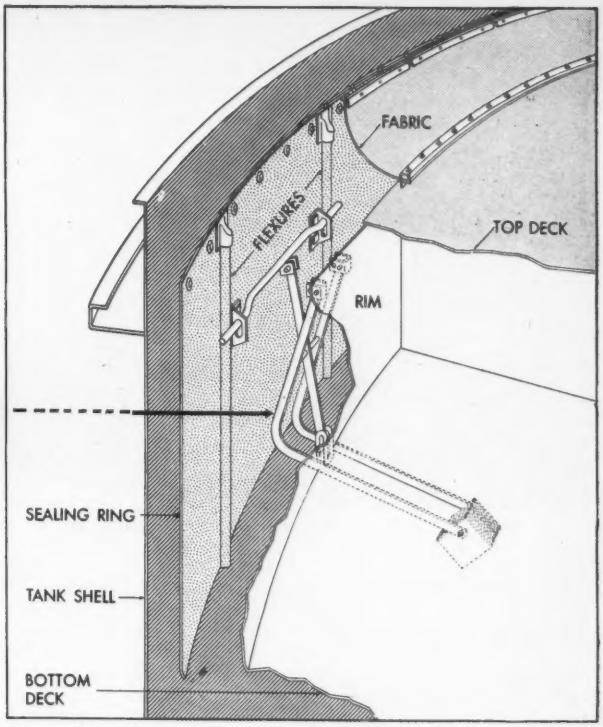
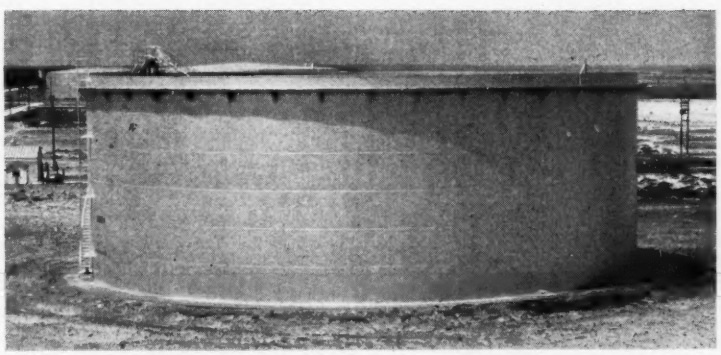


HORTON Double-Deck Floating Roofs



Above: Cutaway drawing showing the improved pantagraph hangers which hold the sealing rings on Horton Floating roofs snugly against the tank shells. Located inside the seal, the hangers are protected from the weather, and the roof deck is left free of obstructions for easy maintenance. Left: A 131,500-bbl. tank with a Horton Floating Roof at the Sun Pipe Line Company's Harbor City, Texas, terminal.

On the Horton Double-Deck Floating Roof, the new pantagraph hangers are part of the Horton Seal—the most efficient device ever developed to close the space between the deck of a floating roof and the tank shell. The job of the hangers is to hold a flexible metal sealing ring snugly against the shell of the tank, and to do this so that the sealing ring maintains a long sliding contact with the shell as the roof moves up and down.

With new engineering developments of this kind, the Horton Double-Deck Floating Roof offers you more economical protection against evaporation loss and dependable, maintenance-free operation. You can use the Horton Floating Roof on new or existing tanks. In the Horton line, flat-bottom oil storage tanks are built in standard sizes from 1,000 to 150,000-bbl. capacities. Ask our nearest office for complete information.

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Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1523 General Petroleum Bldg.
New York, 6.....3347-165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Salt Lake City, 1.....1525 First Security Bank Bldg.
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Seattle, 1.....1325 Stuart Bldg.
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Chicago Bridge & Iron Company, Limited, Apartado 1348, Caracas, Venezuela

Headframe above the shaft from which the horizontal wells are drilled, showing the power house and accessory buildings

zontal wells are drilled in a field where there is some pressure left in the sand. The experimental horizontal oil wells drilled in the United States have been in locations where field pressure has varied from zero to less than 1 lb.

The Australian production per foot of horizontal hole is considerably more than the recovery per foot of vertical hole (in the rock) previously drilled there—probably due to the fact that the entire length of each horizontal hole may be drilled at the most productive level in the sand.

In approximately 150,000 ft. of horizontal water wells installed in the United States, in about 80 locations, where normal pressure (head) exists, production per linear foot of sand exposure is often greater than in equal sand exposure by vertical wells, since the full length of the horizontal well is usually in the bottom of the sand where the head is greatest. Production from 1,500 ft. of horizontal hole often exceeds 10,000,000 gal. of water daily.

The advantages of horizontal oil wells over vertical wells in depleted fields can be increased when artificial pressure (air, gas, or water) is built up in the sand. These advantages could be further enhanced by the application of heat. But of course ideal locations would be in sands where original field pressure exists, such as in Lakes Entrance field. In shallower fields the mine shaft may be eliminated and horizontal wells ½ mile or more in length may be drilled from the surface, each hole exposing as great a length of producing sand as 100 or more vertical wells.

Anglo-Iranian Constructing First Lube-Oil Plant in the Middle East

CONSTRUCTION is going forward on two additions to the process facilities of the Abadan refinery of Anglo-Iranian Oil Co., Ltd., in Iran.

An estimated 20 per cent of the work has been completed on a 400-bbl.-daily lubricating-oil plant which is designed to serve needs of the Middle East market. Construction also has started on a 29,000-bbl.-daily fluid catalytic cracking unit and associated gas-recovery plant.

The lubricating-oil plant, consisting of M.E.K. dewaxing furfural extraction, and clay contacting, is being built by company personnel with design work by E. G. Badger & Sons Co., Boston. It will be the first lubricating-oil manufacturing unit in the Middle East area, though lube facilities are planned in the projected overall expansion of the Haifa, Palestine, refinery of Consolidated Refineries, Ltd. (Anglo-Iranian and Shell).

The Abadan unit is relatively small, but lube processing in the Middle East generally runs into difficulties with refrigeration and other conditions. At present, Anglo-Iranian exports lubes from its plants in Great Britain to the Middle East countries.

The fluid units is the first catalytic cracking installation for the Abadan refinery. Completion is expected late in 1950. Foster Wheeler Corp. has the contract. The unit will allow an upgrading of the octane of the refinery's motor-fuel production and indirectly will improve aviation gasoline.

International

WORLD-WIDE OIL DEVELOPMENTS

Due to the dollar shortage, as much of the equipment as possible is being supplied by British manufacturers.

The Abadan refinery is the world's largest, with a crude capacity of about 500,000 bbl. daily. Capacity of the existing thermal reforming units is about 116,000 bbl. daily. Late last summer the refinery went to about 550,000 bbl. daily, though current runs approximate 500,000 bbl. daily.

Late in April Anglo-Iranian is scheduled to complete and place in operation a new 20 and 22-in. pipe line between Bandar Mashur, a tanker-loading point, and Agha Jari field. This line has a capacity of about 100,000 bbl. daily of crude oil.

ECA Makes Report on Oil Bought Under ERP

WASHINGTON.—Paid shipments of ECA-financed crude petroleum and products to the Marshall plan countries reached a total of $270,300,000 as of February 28, it is disclosed by figures compiled by the Economic Cooperation Administration.

Exports from the United States accounted for $95,200,000 of the total, while shipments from Saudi Arabia accounted for $65,281,000; Netherland West Indies, $45,857,000; Venezuela, $24,581,000; and Iraq, $11,372,000. Of the remainder, $24,297,000 was not broken down by countries of origin, and the rest represented shipments from Mexico, Colombia, Bahrein ($2,851,000), and Iran.

Crude oil represented something under 25 per cent of the oil supplies taken by the Marshall plan countries, amounting to $72,000,000. Product shipments included motor gasoline, $38,400,000; lubricants and greases, $29,300,000; gas oil and diesel oil, $27,000,000; residual fuel oil, $24,300,000; kerosine, $14,500,000; aviation gasoline, $14,100; other products, $11,000,000; and unclassified, $39,800,000.

Figures on shipments by country of destination showed that the United Kingdom received $119,500,000 worth; France, $77,800,000; Italy, $18,400,000; the Netherlands, $9,300,000; Austria, $200,000; Belgium-Luxembourg, $11,200,000; Greece, $4,400,000; Denmark, $15,400,000; Norway, $8,100,000; French Zone of Germany, $1,000,000; Sweden, $4,500,000; and Iceland, $400,000.

The largest taker of crude oil was France with $47,800,000 worth, followed by Italy with $10,000,000, and the United Kingdom and Belgium-Luxembourg with $6,000,000 each.

Laboratory illustration of good water treatment . . . and bad. Test rods, in same water, same temperature and circulation conditions, but only one with Nalco treatment added (left), show the improvement you can expect with The Nalco System.
—Nalco Laboratories Photo

Nalco

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Shipments from the United States included crude, $2,900,000; motor gasoline, $10,400,000; lubricants and greases, $28,500,000; gas and diesel oil, $11,100,000; residual fuel oil, $900,000; kerosine, $900,000; aviation gasoline, $11,700,000; other products, $7,300,000; and unclassified, $21,600,000.

Latin American shipments included crude, $19,600,000; motor gasoline, $3,900,000; gas oil and diesel oil, $6,200,000; residual fuel oil, $4,900,000; kerosine, $2,900,000; aviation gasoline, $400,000; other products, $3,500,000; and unclassified, $8,200,000.

Exports from the Netherlands West Indies included motor gasoline, $16,255,000; residual fuel oil, $10,691,000; kerosine, $8,170,000; gas and diesel oil, $7,502,000; aviation gasoline, $1,660,000; lubricants and greases, $774,000; crude oil, $684,000, and other products, $120,000.

Saudi Arabia furnished crude oil, $38,322,000; residual fuel oil, $6,401,000; motor gasoline, $6,200,000; kerosine, $2,304,000; gas oil and diesel oil, $2,055,000; aviation gasoline, $297,000; and unclassified products, $9,703,000; while Iraq shipped crude, $10,449,000; residual fuel oil, $525,000; and motor gasoline, $398,000; and Bahrein provided motor gasoline, $1,238,000; residual fuel oil, $935,000; kerosine, $216,000; gas oil and diesel oil, $120,000; and unclassified products, $343,000.

State Department Noncommittal on Proposal for Loan for Mexican Oil

WASHINGTON.—The State Department revealed last week that it has had discussions with Sen. Antonio J. Bermudez, director general of Petroleos Mexicanos, on the subject of a loan for Mexican oil development, and at the White House President Truman told a news conference he would favor such a loan if, after study, the various government departments believed it should be made.

So far, there is nothing to indicate that Bermudez has convinced State Department officials that there should be any modifications in the general policy concerning loans for foreign oil development, nor was the President's statement viewed as anything more than a diplomatic way of saying that the matter would remain in the hands of the agencies which generally deal with such questions.

Since the signing of the contract with Pemex, Edwin W. Pauley, former treasurer of the Democratic National Committee and a friend of the President, who was one of the group who negotiated the agreement, visited the White House, but said later he is taking no part in Bermudez' efforts to secure a loan.

A department announcement of the conversations said that Bermudez has been discussing Mexico's plans for development of its oil industry with officials of various agencies, and that the talks included the terms of the contract with Mexican American Independent Co., the need of Pemex for material and technical assistance, and the details of the project pertaining to dollar requirements.

"The department and officers of other interested agencies of the Government are studying the project presented by Senator Bermudez from the points of view of the development of additional petroleum resources in the North American continent, the foreign-exchange position and the general economic development of Mexico, and the traditional view of this Government as to the role of private capital in economic development both at home and abroad," the department stated.

"The general plan for the development of the Mexican petroleum industry includes the construction of a pipe line across the Isthmus of Tehuantepec, a plant for the production of lubricating oils, the construction of new refineries, the modernization of refineries now in operation, and the construction of additional transportation facilities in northeast Mexico in order that reserves of industrial gas may be utilized as fuel for industrial developments in Monterrey, Torreon, and other cities in the area. The appropriate United States authorities are studying this proposal in the expectation of further conversations with Senator Bermudez."

Drilling to Start Soon On First Ethiopian Well

WITH a successful water well drilled and all equipment now at the location, Sinclair Oil Corp. plans to spud in its first test well on its concession in Ethiopia around May 1.

The location for the test is at Gumburo Hills in the Ogaden district of southeastern Ethiopia. the site is about 475 miles southeast of Diredawa, where Sinclair's main camp is located.

A National 100 rig will be used, and the operation will be in charge of Walter Wells, veteran Sinclair superintendent. Most of the equipment was brought in to Jibouti in French Somaliland, moved by the narrowgage railroad to Diredawa, and trucked to the well location. Because of the bends in this road, however, pipe was unloaded from lighters at Mogadiscio in Italian Somaliland and moved by other roads north to the location.

The location was made on the basis of surface geology. Surface geological work and aerial studies are being continued by Sinclair elsewhere in the Ogaden, which is regarded as the most promising part of the country.

Sinclair obtained the Ethiopian concession in 1945 and has exclusive rights in the entire country for the initial 5-year period. The original plans for the test well in the Ogaden were delayed last year because of local disturbances.

Venezuela Planning for A National Oil Policy

A NATIONAL oil policy for Venezuela is being prepared by a committee just established by the Minister of Fomento, Dr. Pedro Ignacio Aguerrevere.

The need for a national policy which is neither personal nor partisan has been felt ever since oil gained world importance, Aguerrevere told the group at its organization meeting March 28.

"To attain this objective," he said, "the government has chosen this committee to represent our foremost economic, political and technical forces. We sincerely believe that orientation of a mining and oil policy should be a combination of national technique, politics, and economics, and not the exclusive expression of one of these three elements, and we feel sure that the committee will present to the federal executive the basis for a policy capable of insuring the Venezuelan nation, investors, and workers of both oil and mining industries stable working conditions and industrial progress."

Observers attached much importance to the creation of this committee believing it to be the first step in a departure from the policy of the former Minister of Fomento, Perez Alfonso, to have the government take a more active part in the operations of the oil companies.

The committee includes Dr. Aurelio Arreaza, Minister of Finance; Dr. Jose Martorano Battisti, director of the Technical Office of Hydrocarbons; Dr. Carlos Paradisi, Director of Mines; Dr. Alfonso Espinoza, former minister of finance; and several engineers and officials of the Banco Central.

Plan for Selling Government Rubber Plants Offered by RFC

by Bertram F. Linz

WASHINGTON. — The Reconstruction Finance Corp. recommended last week that the Government get out of the rubber industry, selling its plants to private industry.

The RFC's recommendations were sent to the President and Congress in compliance with the Rubber Act of 1948, which requires the formulation of a plan for the disposition of the Government's half-billion dollar synthetic rubber industry to private ownership.

The 1948 law also provides for the maintenance of the industry, whether under government or private ownership, with a capacity of not less than 665,000 long tons per year, at least one-third of which must be kept in operation.

The program, developed in cooperation with the petroleum, rubber, and chemical industries, calls for the sale of the plants at fair values determined on the basis of physical appraisal, on reasonable terms, with restrictions designed to prevent "windfalls" to the purchasers. As plants pass into private hands, the Government would correspondingly reduce its synthetic production until, eventually, the entire output would be handled by private industry. Where plants could not be sold immediately, consideration would be given to leasing them, but on terms less favorable than the terms of sale so as to stimulate sales.

Controls May Continue

The RFC report pointed out that while some portion of the synthetic rubber industry as it exists today has attained a firm competitive position, it is doubtful if the industry as a whole has attained the position which would satisfy the minimum requirements of use set forth in the Rubber Act as necessary for national security.

Accordingly, to assure continued operation at the required capacity, it may be necessary to impose controls regulating or implementing the use of synthetic rubber, and so long as such controls are in force it will be necessary for the Government to assure the availability of synthetic rubber at equitable prices to small users. While small consumers would make their own arrangements with private producers to obtain synthetic for mandatory use, it was held, the Government should be authorized to intervene if they are unable to do so and direct delivery from the "retained capacity" at a price which it considers to be fair and equitable.

The "retained capacity" would consist of facilities not sold to private industry, which would be maintained by the Government in standby condition for reactivation in the event of a national emergency.

In its report, the petroleum-chemical advisory committee recommended that, before any sales are made, Congress should pass such legislation as may be necessary to permit two or more individuals, concerns, or corporations engaged in similar or diverse business to join only in the acquisition or operation of government plants, and that United States and Canadian agreements for patent pooling and exchange of technical information be canceled.

Wartime production was in excess of requirements and the Government since has been liquidating its inventory. Production during the fiscal year ended last June 30 was 438,000 long tons while sales were 458,000 tons, and the program for the current fiscal year calls for the production of 394,000 tons and the sale of 414,000 tons.

The income from sales and miscellaneous sources this year is estimated $175,338,000, and it is figured that operating costs and expenses will be $171,299,000, which will leave $3,997,000 for interest on the funds invested and $42,000 as net income from operations. The standby costs are figured at $4,500,000, not covered by the operations of the active plants.

Following is a list of the Government's synthetic rubber plants, with pertinent information on capacity and investment:

	Capacity (long tons)		Investment
	Rated	Demonstrated	
ACTIVE			
Copolymer plants:			
Copolymer Corp., Baton Rouge, La.	30,000	37,500	$7,762,578
Firestone Tire & Rubber Co., Akrin, Ohio	30,000	30,000	7,127,579
Firestone Tire & Rubber Co., Lake Charles, La.	60,000	75,000	12,746,602
General Tire & Rubber Co., Baytown, Tex.	30,000	37,500	8,478,833
B. F. Goodrich Co., Port Neches, Tex.	60,000	75,000	19,492,954
Goodyear Synthetic Rubber Corp., Houston	60,000	75,000	13,171,577
Goodyear Synthetic Rubber Corp., Los Angeles	30,000	37,500	6,514,356
U. S. Rubber Co., Borger, Tex.	45,000	56,250	9,071,931
U. S. Rubber Co., Naugatuck, Conn.	30,000	30,000	9,352,588
Butyl plants:			
Esso Standard Oil Co., Baton Rouge, La.	25,333	28,000	27,163,601
Humble Oil & Refining Co., Baytown, Tex.	30,000	38,000	25,976,819
Butadiene plants (petroleum):			
Cities Service Refining Co., Lake Charles, La.	55,000	55,000	16,889,420
Humble Oil & Refining Co., Baytown, Tex.	30,000	40,000	18,170,413
Neches Butane Products Co., Port Neches, Tex.	100,000	125,000	55,184,845
Phillips Petroleum Co., Borger, Tex.	56,200	56,200	37,617,863
Standard Oil Co. of California, El Segundo	18,000	20,000	8,257,207
Styrene plant:			
Dow Chemical Co., Los Angeles	25,000	36,000	13,599,289
Calcium carbide plant:			
National Carbide Corp., Ashtabula, Ohio	*72,000	.....	3,244,795
DD mercaptan plants:			
U. S. Rubber Co., Naugatuck, Conn.	*1,800	.....	386,360
Gov. Evaluation Laboratories, Akron, Ohio	.....	.....	1,849,260
Total active plants			$302,058,879
STANDBY PLANTS			
Copolymer plants:			
National Synthetic Rubber Co., Louisville	30,000	37,500	$7,252,112
B. F. Goodrich Co., Port Neches, Tex.	60,000	75,000	11,319,179
Goodyear Synthetic Rubber Corp., Los Angeles	45,000	56,250	8,532,833
U. S. Rubber Co., Institute, W. Va.	90,000	112,500	17,154,883
Butadiene plants (alcohol):			
Carbide & Carbon Chemical Co., Louisville	60,000	60,000	32,782,116
Koppers Co., Inc., Kobuta, Pa.	80,000	120,000	47,621,704
Butadiene plants (petroleum):			
Esso Standard Oil Co., Baton Rouge, La.	15,000	20,000	7,046,650
Sinclair Rubber, Inc., Houston, Tex.	50,000	62,500	29,947,918
Shell Chemical Corp., Los Angeles	55,000	55,000	19,654,460
Southern California Gas Co., Los Angeles	30,000	30,000	12,188,802
Total standby			$192,500,657
SURPLUS PLANTS			
Copolymer plant:			
Goodyear Synthetic Rubber Corp., Akron, Ohio	30,000	37,500	$7,887,435
Butadiene plant (petroleum):			
Sun Oil Co., Toledo, Ohio	15,000	12,000	7,561,281
Catalyst plants (butadiene):			
Westvaca Chlorine Prod. Corp., Newark, Calif.	*10,200	.....	1,024,813
Esso Standard Oil Co., Baton Rouge, La.	*5,000	.....	677,974
Total surplus			$17,151,503

*Short tons.

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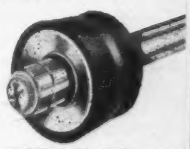

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Chances for Basing-Point Bill Approval Seem Strengthened

WASHINGTON.—A Senate judiciary subcommittee held hearings last week on legislation providing a 2-year "moratorium" on federal prosecutions involving basing-point pricing, with a view to getting the measure to the floor quickly and provide a breathing spell during which Congress can make a further study of the situation created by the Supreme Court decision in the Cement Institute case.

Chances for enactment of the bill were materially strengthened by the disclosure that the Department of Justice has given general approval to the idea, although C.I.O. officials testifying at the hearing assailed it as a covert move by a few big industries to have Congress overrule the court.

While the cement-case decision, in which the court outlawed basing-point systems used as part of a conspiracy to fix prices, precipitated a controversy which now has run for nearly a year, there is expectation that the situation will be clarified by the decisions in the rigid steel conduit case now before the Supreme Court and the Standard Oil Co. (Ind.) case which is in the lower courts.

Oil Case Cited

However, the subcommittee was told by Herbert Johnson of Jones & Laughlin Steel Corp., the March 11 decision of the Seventh Circuit Court of Appeals in the oil case "lends to the inescapable conclusion that competitive pricing has been practically eliminated through the Federal Trade Commission's interpretations of the law."

In that case, the commission held that meeting competition in good faith cannot be pleaded as a defense of a pricing system if there is an injurious effect on competition.

"The need for clarifying legislation, which was apparent even before the decision in the Standard Oil case, is now more urgent than ever," Johnson declared, adding that he does not believe the Supreme Court decision in the rigid steel conduit case will resolve the issue.

Johnson warned the subcommittee that the pricing question might be an important factor in dealing with any drastic change which may occur in the economic situation.

"Economists who have predicted a period of recession or readjustment for the near term have rather generally stated that industrial plant construction and expansion would be one of the supports which would prevent a drastic swing in the business cycle," he said. "Since the expansion and establishment of business, both large and small, are influenced by questions of the legality of freight absorption and pricing methods, such programs may be suspended until this question has been settled. In the interim, it will be reassuring to business in general if a moratorium is provided which will indicate that a definite answer to the question is forthcoming."

New Oil, Gas Tax Bills Filed in Texas House

AUSTIN.—Three more oil and gas bills were filed in the Texas Legislature as the period for the introduction of house bills came to an end.

A bill raising state omnibus taxes 10 per cent was offered by Rep. Joe Fleming of Henderson, chairman of the house committee on revenue and taxation. Fleming's bill which he says is "just insurance," would raise approximately $20,000,000 more per year. He said it was a skeleton bill and would be torn up and rewritten altogether if a new tax were needed.

Rep. C. D. Young of Linden introduced a bill calling for a graduated tax upon crude oil. Production below 1,000 bbl. per month would pay 1.5 per cent on the market value. The scale would increase according to monthly production.

A natural-gas gathering tax, ranging from 1½ cents per 1,000 cu. ft. on gas selling below 5 cents to 2½ cents on 10-cent gas, was proposed by Rep. Jimmy P. Horany of Archer City. The state now collects 5.2 per cent on market value from producers.

Fleming's bill would hike the price of gasoline from 4 to 4 4/10 cents per gallon retail. The tax increase would also include oil, gas, sulfur, alcoholic beverages, retail sales of automobiles, radios, cosmetics, and playing cards.

Other action pending in the Texas Legislature includes a subcommittee report this week on the 1-cent-per-gallon Texas processing tax, introduced by Rep. Davis Clifton. (A similar tax bill is awaiting final action in the Oklahoma house.)

A hearing has been set this week for a bill designed to regulate seismograph exploration in submerged areas. Author of the bill is Rep. O. E. Cannon of Corpus Christi.

A resolution was passed last week by the house asking the Railroad Commission to appear before the federal authorities and protest the "indiscriminate shipping of gas away from Texas to the East." Author of the bill, Rep. W. R. Chambers of May, said that Texas must keep it own gas if it is to become an industrialized state.

House Bill 59, introduced by Rep. C. S. McLellan of Eagle Lake and providing for a flat 1-cent tax per 1,000 cu. ft. of gas, is considered by some as the bill most likely to get support.

Louisiana Allowable Cut 7,000 Bbl. for April

BATON ROUGE.—Louisiana's gross daily allowable of crude oil, condensate, and distillate in April will be 527,000 bbl., a small drop from the current figure of 534,000 bbl., Conservation Commissioner S. L. Digby has announced.

Allowing for a current production of 45,000 bbl. of liquid hydrocarbons, less an estimated underage of 35,000 bbl., he stated a net crude oil allowable of 517,000 bbl. would be set to reach a production of 482,000 bbl.

The new allowables, by districts, are as follows: Houma, 83,760 bbl., Lafayette, 131,753 bbl., Lake Charles, 62,583 bbl., New Orleans, 118,108 bbl., Monroe, 78,040 bbl., and Shreveport, 43,223 bbl.

April Allowable Virtually Unchanged for Oklahoma

Virtually no change has been made in Oklahoma's crude-oil allowable for the month of April, as compared with the March allowable, the Oklahoma Corporation Commission reported. Only minor changes in allowables for individual fields caused a slight change in the total figure.

Allowable for April is set at 387,290 bbl. daily, compared with 388,811 ordered for March. Figure set for allocated pools is 184,290 bbl. daily, and 203,000 bbl. daily for unallocated areas.

New Mexico Allowable Is Cut Another 4,000 Bbl.

Daily allowable production of crude oil in New Mexico has been set at 138,000 bbl. for April by the state proration commission, which is a reduction of 4,000 bbl. daily compared to the March allowable.

Reduction in the state's allowable now stands at 6,000 bbl. daily below February's allowable of 144,000 bbl. daily.

California Standard Set Record In All Categories During 1948

Annual Reports

The Journal here continues giving the 1948 operating highlights of oil and gas companies as revealed in their annual reports. Additional summaries will appear in future issues.

STANDARD OIL CO. OF CALIFORNIA produced, refined, and sold more crude oil and products during 1948 than in the preceding year, the company announces in its annual report.

Achieving these records required capital expenditures of $175,000,000 for domestic and foreign operations during 1948. The report, commenting on the industry-wide outlook, states, "As we enter 1949, conditions in the industry are showing some effects of a transition period. Crude-oil production has been curtailed in certain areas and some product prices have been reduced. While the general industry operations are continuing at a high level to meet the demand, the fact that normal economic adjustments are in process should be noted in connection with the current year."

Gross crude oil production for the year was 104,999,652 bbl. (286,900 bbl. daily average), as compared with production of 96,032,441 bbl. (263,100 bbl. daily average) in 1947. This enabled California Standard to set a new crude production high for the eighth straight year, and maintain its position as the third largest producer of crude oil in the United States.

Active Drilling Program

The 687 wells drilled during the year represented the most active drilling program in the company's history. It resulted in 612 producers, 7 gas producers, and 68 dry holes. A major factor in this production growth was a 22 per cent increase made by subsidiaries operating in the Gulf Coast, Rocky Mountain, and Mid-Continent areas. New fields were discovered in Guijarral Hills field in San Joaquin Valley, California; in North Snyder field in western Texas; and in the offshore area in the Gulf of Mexico near the mouth of the Mississippi River.

Refinery runs in 1948 were 112,401,581 bbl. (307,100 bbl. daily average), as compared with runs of 98,748,966 bbl. (270,500 bbl. daily average) in 1947. Increased manufacture of gas oil and diesel fuel reflected an increase in market demand for these products.

While refinery expansion continued, the rate of development slackened due to progress made the preceding year. However, additions are being made to the refineries at Bakersfield, Richmond, and El Segundo, Calif. The Bakersfield project, doubling the capacity of the refinery, was begun at midyear and is making substantial progress.

Outstanding transportation development of the year was completion by Salt Lake Pipe Line Co., a subsidiary, of a 182-mile pipe line from Rangely field in Colorado to Salt Lake City, through mountainous terrain for most of the distance.

Operations abroad were expanded throughout the year. Arabian American Oil Co. increased production in Saudi Arabia from a 1947 daily average of 246,200 bbl. to 390,300 bbl. in 1948. Current production is about 500,000 bbl. per day. Discovery of a major oil field at Ain Dar further increased the magnitude of Saudi Arabia's proven reserves.

Bahrein Petroleum Co., Ltd., produced 29,800 bbl. of crude daily on Bahrein Island, in the Persian Gulf, and refined 149,300 bbl. per day. Refinery runs included oil brought from Saudi Arabia by submarine pipe line.

Included among California Standard affiliates are the Caltex marketing companies, which are completing refineries in France and Holland to process 33,000 bbl. daily. Plans are also going forward for the construction of refineries in Italy and Spain, which California Standard believes will play an important part in the European Recovery Program.

In the Western Hemisphere an active development and exploration program was continued in Venezuela, and 27 wells were completed in the new Boscan-Albaricos field by a subsidiary, Richmond Exploration Co. A pipe line has been built from the field to the company's terminal at Lake Maracaibo, and oil shipments have begun.

Net earnings per share of stock in 1948 were $12.42 as compared with net earnings per share of $8.25 in 1947.

Atlantic Refining's Efforts to Meet Consumer Demands Were Successful

IN a successful effort to meet increased consumer demand, Atlantic Refining Co. during 1948 drilled more producing wells than in the previous 2 years, increased refining capacity, and expanded pipe line and tanker facilities, the company's annual report reveals.

Looking forward to a period of intensified product competition Atlantic also gave attention to its marketing facilities during the year.

Production during 1948 made possible a net crude-oil output of 27,663,000 bbl. (75,789 bbl. daily average) as contrasted with a net crude production of 24,333,000 bbl. (66,665 bbl. daily average) in 1947. Reflecting this increase in production Atlantic's drilling operations were larger than in any of the last 10 years. Wells drilled in known fields totaled 180, of which 162 were producers. In an effort to find new fields 24 exploratory wells were drilled, 9 producing oil and 4 producing gas and condensate.

Greatest increase in production resulted from drilling in Block 31, Midway Lane, McKee, and TXL pools in West Texas; Dave Haas field in Louisiana; and Sholem Alechem field in Oklahoma.

An important milestone in foreign operations was the first regular tanker shipment of crude oil from Venezuela, marking the successful completion of 4 years of extensive exploration work. Fourteen oil wells and one gas well were completed in the Tucupido and Pelayo concessions owned jointly with Pancoastal Oil Co. Some production was found on the company's wholly owned concession in the Saban area. In addition, Atlantic owns an interest in Guasare Oil Co. which holds concessions in western Venezuela.

Crude refinery runs in 1948 were 53,271,000 bbl. (145,500 bbl. daily average) as compared with crude runs of 50,322,000 bbl. (138,000 bbl. daily average) in 1947.

In view of shifting demands for products the company is installing refinery equipment which will convert lower-value residual fuel into higher-value lighter products such as gasoline, kerosine, and fuel oil. Expansion of facilities to manufacture lubricating oils, waxes, synthetic wetting agents, and detergents was completed during 1948.

Atlantic's research department worked on the development of better methods to produce more crude oil, improve refining processes, and the

(Continued on page 141)

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Right Down the Line

WASHINGTON.—President Truman last week claimed credit for forcing prices down, but continued to insist upon enactment of standby control powers and a $4,000,000,000 increase in taxes.

The President not only differed from his congressional leaders on the need for these measures but went right down the line, attacking a proposal by Chairman Carl Vinson of the House armed services committee to increase military appropriations by $1,500,000,000, opposing any cut in Economic Cooperation Administration funds, and reiterating his support of Mon C. Wallgren's appointment as chairman of the National Security Resources Board.

Mr. Truman told a news conference that his repeated requests for control authority had been a factor in checking the upward spiral, but said inflationary pressures have been eased only temporarily and there still is need for the tax increase and his economic stability bill which provides allocation authority and price and wage controls and would permit the Government to construct steel and other industrial plants to ease shortages of materials.

At the Capitol, even strong supporters of the President said he was not likely to get his program during this session of Congress. Sen. Joseph C. O'Mahoney of Wyoming, chairman of the joint economic committee who previously had urged the granting of standby controls, said there is only a remote chance they will be granted.

Sen. Walter F. George of Georgia, chairman of the finance committee, declared the President could not get a tax increase out of Congress now and said the way to prevent a deficit is to cut expenditures, a position which was supported by prominent Republican members. Sen. Burnet R. Maybank of South Carolina, chairman of the banking and currency committee, said no hearings or other action was planned on the President's control legislation.

Even Sen. Scott W. Lucas of Illinois, majority leader, said the control bill is not on the list of measures to be pushed.

Buy Low and Sell High

ITS heads I win and tails you lose when you do business with the Government.

For instance: Independent refiners who took advantage of the O'Mahoney Act to make preferential purchases of government royalty oil at premium prices back when they were unable to get adequate supplies on the open market find it will take an act of Congress to release them from their contracts, now that the shortage is over and the royalty oil would bring little or no premium.

On the other hand, companies selling the military find that when the market drops below the contract price they have to make quick adjustments to keep the Government from terminating contracts and buying on the open market.

At the time the O'Mahoney Act was passed back in 1946, the Interior Department was selling government royalty oil to the bidder of the highest premium above the posted price. The act gave small independent refiners a preference in the sale of the oil, and many of them are today paying considerably more for crude than they would have to on the open market. Appeals to the department for relief, however, have brought only the response that it would take an act of Congress to modify the contracts.

Over the past 6 months the department hasn't been able to interest the refiners in its royalty oil because of the rapidly changing supply situation, and the O'Mahoney Act has been practically repealed in favor of the law of supply and demand.

One for the Album

PRESSURE is building up behind the proposal to have the Post Office Department issue a special stamp in August to commemorate the ninetieth anniversary of the invention of the oil well by Col. Edwin L. Drake, and it is probable Congress will order the stamp despite the opposition of the department to the flood of special issues which started last year.

There is, undoubtedly, more basis for the issuance of this stamp than for the funny-looking poster put out last year to honor the American hen, which was not an American invention, or the one that is being urged to celebrate the imminent removal of tolls over a bridge somewhere out West.

So far this year, congressmen have introduced measures calling for the printing of something like 60 special stamps, including one to honor the Angora goat (not the American taxpayer—that's a different breed), another to encourage the mailing of good-will letters to foreign countries, a third to symbolize national unity, and a series of 144 depicting the flags, seals, and official flowers of the 48 states.

But the petroleum stamp, Sen. Edwin Martin of Pennsylvania told the Senate last week, will call the attention of the American people to the importance of maintaining our supremacy in oil.

"We need to maintain our leadership in this product, not only for our peacetime economy, but also for national defense," Martin said. "Two world wars have demonstrated that the United States cannot depend upon foreign oil in an emergency."

Citing current heavy imports and the threat they may result in the abandonment of thousands of stripper wells, Martin declared the proposed stamp would center attention upon the problem, a study of which is of vital importance.

Steel Looks Up

THE decade-long sellers' market in steel is passing into history, and within a few months steel mills which a year ago carefully picked their customers will be pleading with customers to pick them.

The gray market is dead and conversion deals are on their last legs, probably to pass out of the picture by midyear. Prices are softening, cancellations are increasing, and the steel scrap market is in bad shape—all signs that steel supply is fast overtaking demand. With the mills working at better than 100 per cent capacity, the steel industry is confident that the administration's plan to build additional steel capacity is dead and soon will be buried deep.

If present prediction of steel supply fail to come true it will be due to John L. Lewis. The steel mills have been able to weather the walkout of coal miners which Lewis called in a vain effort to prevent the confirmation of Dr. James Boyd as director of the Bureau of Mines, but will be in no shape to stand another interruption of fuel supplies this summer when Lewis and the operators talk about a new contract.

Reports from the industry relate that while conversion deals are still being made for the second quarter, hardly any large company wants them thereafter, and some of those being made for the next 3 months may be canceled if they are not needed. With the easing of mill supplies these deals are becoming undesirable to many steel consumers other than some of the large gas pipe lines.

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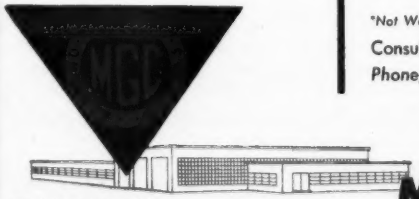

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I.P.A.A. Seeking Methods to Assure Control of Oil Imports

WASHINGTON.—The import policy committee of the Independent Petroleum Association of America met in Washington again April 7 for an exploratory discussion of the situation to determine what further steps may be taken to secure controls on oil imports.

The committee was set up in February by Fred W. Shield, president of the I.P.A.A., and held its first meeting in Washington February 20 to outline its presentation to the Senate finance committee the following day, when it urged the inclusion of safeguards for the domestic industry in the legislation extending the Reciprocal Trade Agreements Act.

This week's meeting of the committee was confined to a general discussion of the problem and the possibilities of other approaches to its solution, including the petition filed with the Tariff Commission in February asking for an investigation of the effect upon the domestic industry of the concessions granted in the reciprocal trade agreements now in effect, and application of the escape clause in those agreements to protect the domestic producers from injurious competition.

Decrease Not Enough

The latest figures compiled by the I.P.A.A. indicate that during the last half of February and first half of March crude imports had dropped to 375,000 bbl. daily from about 450,000 bbl. daily in January.

It was held, however, that even with this decrease, imports are still far above the level of a year ago, when they averaged 280,000 bbl. daily, and domestic output has been forced to a point well under last year.

"Another discouraging aspect is related to refinery operations and, in particular, to refinery runs of foreign crude oil," it was stressed by Russell B. Brown, general counsel of the association, in a report on the situation. "During the latest 4-week period, refineries drew foreign crude out of storage for processing at an average rate of 34,000 bbl. per day. In other words, the importing companies appear to have reduced their shipments by 75,000 bbl. daily but, at the same time, started to use 34,000 bbl. daily of foreign oil out of stocks that had been built up previously. This of course has the effect of offsetting a large part of the reduction in imports by meeting the demand out of foreign oil storage rather than new shipments of foreign crude. At the same time, it denies to the domestic industry a large part of the market made available by reduced imports. This is a serious condition that should be recognized in connection with the current downward trend of imports."

N.A.C.E. Program for Cincinnati Meeting

Mitigation of corrosion occurring in production, refining, pipe lining, and offshore operations will be discussed at the annual meeting of the National Association of Corrosion Engineers to be held at the Netherland Plaza Hotel, Cincinnati, April 11-14.

While the association gives attention to corrosion problems of major industries throughout the country, the 21 papers relating to problems of the petroleum and natural-gas industries represent nearly half of the entire program.

After the single session Monday afternoon, April 11, devoted to a symposium on corrosion principles, the following 3 days will have two sessions running concurrently both morning and afternoon. At the annual banquet, April 13, awards will be presented and an address will be delivered by Dr. W. F. Clapp, William F. Clapp Laboratories, Duxbury, Mass.

Papers relating to oil and gas-industry problems include:

Cathodic protection symposium, April 13: "Electrolysis Experiences on 115 kv. High Pressure Oil Filled Pipe Type Cable Installation in New Orleans," by Sidney E. Trouard, New Orleans Public Service Inc., New Orleans; "Engineering Aspects of Cathodic Protection as Applied to Pipe Lines," by E. P. Doremus, G. L. Doremus, and M. E. Parker, Cathodic Protection Service, Houston; "Cathodic Current Distribution in Some Zinc-Steel Systems," by T. P. May, International Nickel Co., New York, and George S. Gordon, General Electric Co., Pittsfield, Mass. "The Corrosion Products on Zinc Anodes Used Underground," by E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa.

Oil industry symposium, April 14: "Neutralization As a Means of Controlling Corrosion of Refinery Equipment," by E. Q. Camp and Cecil Phillips, Jr., Humble Oil & Refining Co., Baytown, Tex.; "Corrosion of Wet Steel by Hydrogen Sulfide-Air Mixtures," by D. C. Bond and Glenn A. Marsh, Pure Oil Co., Winnetka, Ill.; "Oil Can Control Wear," by R. E. Jeffrey, Jr., and J. M. Plantfeber, Shell Oil Co., San Francisco, Calif.

Salt water corrosion symposium, April 14: "Corrosion of Steel Pipe by Chlorinated Sea Water at Various Velocities," by V. B. Volkening, Frontier Chemical Co., Denver City, Tex.; "Some Experiments on the Resistance to Corrosion of Cast and Wrought Aluminum Alloys in Sea Water," by J. L. Basil and W. C. Stewart, U. S. Naval Engineering Experiment Station, Annapolis, Md.; "The Cathodic Protection of Steel Piling in Sea Water," by H. A. Humble, Dow Chemical Co., Midland, Mich.; "The Deterioration of Steel Piling Groins at Palm Beach, Florida," by C. W. Ross, Beach Erosion Board, Corps of Engineers, Dept. of the Army, Washington; "Corrosion and Protection of Offshore Drilling Rigs," by C. P. Larrabee, Carnegie-Illinois Steel Corp., Vandergrift, Pa.

Gas industry symposium, April 14: "Experience and Economic Benefits From Cathodic Protection on Gas Distribution Systems," by A. W. Peabody and C. L. Woody, Ebasco Services, Inc., New York; "Preparation of Pipe Surface During Reconditioning for Bitumen Coating," by O. C. Mudd, Shell Pipe Line Corp., Houston; "Technical Factors in Testing Pipe Line Coatings," by D. E. Stearns, M. W. Belson, and Robert H. Lee, D. E. Stearns Co., Shreveport, La.; "Field and Laboratory Tests of Sodium Chromates and Alkalies for Controlling Corrosion in Gas-Condensate Wells," by C. K. Eilerts, R. V. Smith, F. G. Archer, L. M. Burman, Faye Greene, and H. C. Hamontre, U. S. Bureau of Mines, Bartlesville, Okla.

Regulation Will Clarify ECA Policy on Oil Prices

WASHINGTON.—A new regulation setting forth policy of the Economic Cooperation Administration on prices paid for oil and other commodities by Marshall plan countries is being drafted following a conference of ECA officials and 21 representatives of private industry.

The new regulation will be in the form of an amendment to the present rule. It will make no major changes in policy, but is designed to clarify the details of the present procedure.

Under the law, ECA can not finance purchases at prices in excess of domestic market prices adjusted to reflect transportation and other factors.

Next Week

New rig of Carter Oil.—A specially engineered mud system speeds operations.

Cat crackers and catalysts.—Trend of development discussed by prominent refinery engineer.

New laboratory at Dallas.—Atlantic Refining consolidates all its exploration-production research in centralized location.

Salt-water disposal.—Engineers J. R. Hatfield and L. B. Hicks of Cities Service detail operating problems and practical solutions.

Symposium on "Refinery Maintenance."—A complete four-paper discussion on this important subject, by authors from Standard Oil Co. (Ohio), Esso Standard Oil Co., The Texas Co., and C. F. Braun & Co.

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TABLE OF CONTENTS

	PAGE
Introduction	5
Section I. Installing, and Operating Wire Rope — Unreeling, uncoiling, spooling, fleet angle, sheaves and drums, break-in, smooth operation, lubrication, inspection, saving rope, abuses, when to get a new rope.	7
Section II. Selecting the Correct Wire Rope for the Job — Strength, flexibility, resistance to abrasion, crushing strength, dimensions, strands and rope construction, grades of steel, fabrication, type of core, lay, examples of orders, and where to buy rope.	23
Section III. Catalogue of Standard J&L Wire Rope Constructions	47
Section IV. Standard Fittings, Slings, and Splicing Service Available with J&L Wire Rope	67
Section V. General Recommendations for Ropes in Use on Standard Equipment	87

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PERSONALS

Parkhurst Vice President Of California Standard

GEORGE L. PARKHURST, president of Oronite Chemical Co., the chemical products marketing subsidiary of Standard Oil Co. of California, has been named a vice president of the parent company.

An expert in the field of high-octane gasoline research, Parkhurst joins the parent company with a wide knowledge of petrochemistry, and experience in the field of chemical engineering.

Formerly in the petroleum-chemistry industry in the Middle West for a number of years, Parkhurst for 14 years was a chemical engineer for Standard Oil Co. of Indiana. In 1941 he joined Petroleum Administration for War under R. K. Davies, and remained with PAW 4 years, during which time he specialized in 100-octane aviation gasoline research. He was assistant director of refining, and later contract executive with responsibility for plant approvals, contracts, and prices in connection with the 100-octane gasoline program.

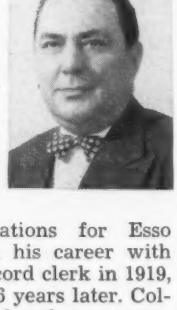
A graduate in chemical engineering from Illinois Institute of Technology in 1927, Parkhurst did graduate work in chemistry at the institute for 3 additional years. He received a J.D. degree from De Paul University in 1934.

Eugene T. Singer, senior vice president and a director of Standard-Vacuum Oil Co., has announced his retirement. A key figure in the post-war reorganization and rehabilitation of the company's facilities in the Far East, he began his career as an accountant in the Hong Kong office in 1912. After becoming chief accountant there, he returned to the New York office in 1924. From 1926 to 1928 he traveled throughout the Far East and Oceania, completely reorganizing the accounting procedures of all company offices from Bombay to Tokyo. Singer also helped organize oil exploration programs covering Papua and New Zealand. He became treasurer of Standard-Vacuum in 1934, was named a director in 1939, and was appointed vice president in 1942.

E. L. Fipps, geologist with Plymouth Oil Co., has opened offices in the Petroleum Bldg. in Oklahoma City.

J. H. Sidwell, formerly associated with Sinclair Prairie Oil Co. in the production department at Houston, has accepted a position with Hiawatha Oil & Gas Co., San Antonio, Tex.

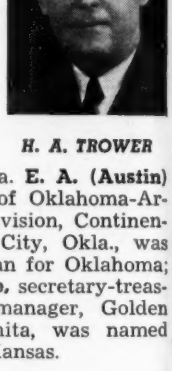
Norman C. Smith, formerly geologist with Humble Oil & Refining Co. stationed at Tallahassee, Fla., has resigned to form the Western Photo-Geological Co. in Tulsa.



E. H. Collins has been named a director of Esso Standard Oil Co. Collins, who is also a vice president and director of Esso Standard Oil Co. of Pennsylvania, will continue his duties as general manager of marketing operations for Esso Standard. He began his career with the company as a record clerk in 1919, entering sales work 6 years later. Collins served as branch sales manager in Baltimore, Md., and as division manager in South Carolina. Transferred to New York, he was named assistant northern regional sales manager and later manager for the southern region. In 1947 he was appointed manager of wholesale marketing and the following year, general manager of all marketing operations for the company.

William W. Rice, formerly with Pierce Oil Corp. refinery at Sand Springs, Okla., and a former refinery of Barnsdall Oil Co., has been appointed manager of the newly created special-products department, Deep Rock Oil Corp., with headquarters in Chicago. He joined Deep Rock in 1930.

Earl G. Griffith has resigned as resident geologist in the Bolivar coastal fields for Mene Grande Oil Co. in western Venezuela, and is now with The Texas Co., in Lewistown, Mont.



H. A. TROWER

Harry A. Trower, vice president, Phillips Petroleum Co., Bartlesville, Okla., has been elected to the chairmanship of the Kansas-Oklahoma district, Oil Industry Information Committee, succeeding **R. F. Pielsticker,** Skelly Oil Co., Tulsa. **E. A. (Austin) Williford,** manager of Oklahoma-Arkansas marketing division, Continental Oil Co., Ponca City, Okla., was named state chairman for Oklahoma; and **Julius T. Groene,** secretary-treasurer and general manager, Golden Rule Oil Co., Wichita, was named state chairman for Kansas.

Miss Bobby Clawson, graduate of University of Kansas, has joined Magnolia Petroleum Co. in Midland, Tex., as a geologist.

David Randolph Salmon has joined staff of Oil Industry Information Committee as educational coordinator, in New York City.

Merrill R. Webster, Olean, Pa., has become manager of the fuel oil and burner department of Campbell Oil Co., Olean, which recently purchased Webster Oil Co. Announcement of purchase of the firm was made by **Kenneth E. Campbell,** president of Campbell Oil Co.

E. A. Cunningham, former public relations manager for Shell Oil Co., Inc., San Francisco, has been moved to Baltimore as manager of Shell's sales organization in Maryland, Virginia, and the Carolinas.

D. S. Warning, Standard Oil Co. (Ind.), has been promoted to assistant general manager of the distribution-economics department of the company. **W. L. Leavitt** has been promoted to manager of the commercial-research division in the same department, succeeding Warning. Warning joined the company in 1937 as an analyst in the sales-research department and became manager of the commercial-research division of the distribution-economics department in 1947. Leavitt joined Indiana Standard in 1946 as an economist in the sales-research department.

Three promotions were announced recently at the refinery of Pan American Refining Corp., Texas City, Tex. **Paul A. Stewart** has been named head of the thermal cracking division; **George Moyer** has been named head of light oils division; and **Charles Kenneth Fleming** has been promoted to assistant head of the light oils division. Stewart joined the company in 1935, and formerly served as assistant department head of the light oils division from 1937 to 1943. Moyer, a graduate of Lehigh University, Bethlehem, Pa., joined the firm several years ago after having worked for U. S. Gypsum Co. at East Chicago, Ind. Fleming has been with the firm since 1946, when he joined the laboratory organization as a chemical engineer.

M. H. Robineau, president and general manager, Frontier Refining Co., Denver, has been elected a new director of Western Petroleum Refiners Association.

H. G. Ellis has been elected vice president in charge of production for Buffalo Oil Co., Dallas. He will continue to make his headquarters in Artesia, N. M., where he has been acting as superintendent of production. Ellis first entered the oil business in the Mid-Continent area with Wiser Oil Co., at Bartlesville, Okla. He later entered drilling-contracting business, and subsequently joined Buffalo in May 1937. He has acted in various capacities in both the land and production departments during his 12 years with the firm.

Several personnel changes have been made in the organizations of Shell Oil Co., Inc., and Shell Chemical Corp. **A. H. Calderwood** has been transferred to the New York City office and appointed manager of manufacturing for Shell Oil Co. He joined the company in 1923 as assistant inspector, purchasing department at Los Angeles, and was later transferred to the Wilmington refinery. He was transferred to Martinez, Calif., refinery in 1932. Appointed manager of the Wilmington refinery in 1942, he has been manager of manufacturing in the San Francisco office since 1946. **Bruno Stolley** has been named manager of the Emeryville, Calif., laboratories of Shell Development Co., replacing **T. W. Evans,** who was appointed research director of the company. Stolley joined the firm in 1930 as a junior engineer at the Norco refinery. In 1936 he went to the Wood River, Ill., refinery as assistant chief engineer, and since 1946 has been assistant manager of Shell Oil Co.'s personnel department in New York. **R. W. Faulk** has succeeded Stolley as assistant personnel manager in New York. **E. A. Romer** has been appointed assistant to the vice president of transportation and supplies, in New York for Shell Oil Co. He started with the firm in 1929 as a draftsman at the Wilmington refinery. **F. D. Kuenzly, Jr.,** has been appointed superintendent of Shell Chemical Corp.'s Shell Point plant at Pittsburg, Calif. A graduate of University of California where he majored in chemistry, he joined the firm in 1934 as a chemist. **J. F. McGarry** has been appointed acting assistant superintendent of Shell Chemical's Houston plant. He joined the firm in 1933.

Dan W. Cameron, Tulsa, has been made assistant to the manager of the crude-oil purchasing department, Carter Oil Co. He previously served as assistant to **O. C. Schorp,** president. Cameron joined the firm in 1935, and served as field scout until 1943, when he was promoted to division chief scout at Mattoon, Ill.

J. L. Irvin, who has served as general superintendent of pipe lines since 1946 for Gulf Oil Corp., has been named general manager of pipe lines,

J. L. IRVIN and N. H. PERRY

Houston division. Irvin succeeds **N. H. Perry,** vice president in charge of pipe-line operations, who has retired. Before becoming vice president 3 years ago, Perry had served for 27 years as general superintendent of pipe lines. Irvin has been with Gulf since 1917, when he joined the company as a machinist. He became assistant chief engineer in 1929, assistant general superintendent, and then general superintendent. Perry joined the firm in the old Batson field, starting as fireman at a pump station at Lufkin, Tex. For 5 years he was pipe-line superintendent for Gulf in Tampico, Mexico.

Thomas D. Tifft, Sinclair Refining Co., has been appointed chief engineer of the company's refining division, and will have complete charge of all engineering problems. He joined the firm at Chicago in 1920 as engineer, and in 1929 was transferred to the New York City office as assistant chief engineer, which position he held previous to his new appointment.

J. V. Powell has been named general manager of the Development Division, a new section of the Oronite Chemical Co. originated to cover activities in product development, technical service, market research, and engineering. Powell, previously associated with the parent Standard Oil Co. of California, joined Oronite in 1947 as an engineer in the Product Development Division. He graduated from the Institute of Technology at Prague, Czechoslovakia, with a degree in electrical engineering, and took graduate work at Charles University in Prague and the University of California.

H. G. Groves, fuel engineer, Carter Oil Co., Billings, Mont., has been elected president of the Billings Engineers' Club.

Vernon Siebenlist, manager in charge of purchasing, for Carter Oil Co. at Denver, has been transferred to Tulsa as a buyer in the material-traffic department. He has been with the company 2 years.

Transfers and promotions in the production department have been announced by **J. H. Russell,** vice president of Gulf Oil Corp. and Gulf Refining Co. The changes, effective April 1 follow: **C. B. Hussey,** zone petroleum engineer, Odessa, Tex., to the Houston executive department as division petroleum engineer; **Neal B. Martin,** Shreveport district chief clerk, to Houston district production department, as assistant to the superintendent of production; **D. R. Carmichael,** zone chief clerk, Laurel, Miss., to Harvey, La., as zone chief clerk; **T. B. Young,** assistant zone petroleum engineer, Laurel, Miss., to Houston district production department as assistant chief petroleum engineer; **C. F. Russ,** assistant to the superintendent of production, Houston district, to the Houston executive department as division field examiner. **E. L. Petree,** chief petroleum engineer, Houston district, to assistant superintendent of production;

PERSONALS

J. A. Perkins, Jr., Houston district petroleum engineer to assistant chief petroleum engineer; **W. B. Hopkins,** division petroleum engineer, to the Houston district production department as chief petroleum engineer; **J. D. Bell,** zone chief clerk, Harvey, La., to Laurel, Miss., as zone chief clerk; **E. A. Lewis,** chief field auditor, to the Houston executive department as staff assistant.

Henry W. Anderson, shift foreman since April 1933, at Bayway, N. J., refinery, Esso Standard Oil Co., has been named assistant supervisor of the atmospheric-distillation division of the distillation and cracking department, succeeding **William J. Wiseman.** Wiseman has been given a rotational assignment as technical assistant to **William C. Jehle,** head of the thermal cracking division. Anderson joined the company as a refinery utilityman at Bayway in 1915. He was assigned to pressure stills in 1918, and in February of the following year was made a stillman in the batch stills. He became part-time foreman in the crude stills in 1925 and a shift foreman in 1933. Wiseman joined Esso Standard in 1933 as a helper in the meter-repair department at the Baltimore refinery. He was transferred to Bayway's chemical-products department in 1939 and became a supervisor in 1941; a technical assistant in 1943; and an administrative assistant in 1944.

New president of North Texas Oil & Gas Association who took office March 26 is R. Clay Underwood, left, Wichita Falls, Tex., independent oil producer. At right is George Dimock, also of Wichita Falls, outgoing president. Other officers of the association include: Marvin E. McCullough, and Charles E. Prothro, vice presidents; and Fred Sehmann, executive vice president. All will serve during the 1949-50 term

SHIFTS—

Irving Dagan, engineer, California Standard Oil Co., Los Angeles to Coalinga, Calif.; **James C. Farris,** engineer, Stanolind Oil & Refining Co., Brownfield to Fort Worth, Tex.; **J. L. Elkin, Jr.,** geologist, Humble Oil & Refining Co., Dallas to Columbus, Tex.; **D. R. Criswell,** geologist, St. Anthony Oil Corp., Olney to Abilene, Tex.; **F. L. Thompson, Jr.,** engineer, Humble Oil & Refining Co., Overton to Encino, Tex.; **H. M. Bramley,** engineer, Lone Star Gas Co., Shamrock to Colorado City, Tex.; **J. F. Anderson,** geologist, Warren Oil Corp., Wichita Falls to Houston; **L. B. Horr,** superintendent, Tucker Oil Co., Wichita Falls to Thrift, Tex.

Roy P. Dwyer, engineer, The California Co., Harvey to New Orleans, La.; **J. R. Katulek,** superintendent, W. A. Schuller Co., Crossville to Grayville, Ill.; **W. E. McCommons,** engineer, Halliburton Oil Well Cementing Co., Fairfield to Evansville, Ill.; **A. J. Rosenlieb,** superintendent, The Ohio Oil Co., Marshall, Ill., to San Fernando, Calif.; **Thomas A. Steele,** engineer, The Ohio Oil Co., Reed City, Mich., to Hobbs, N. M.; **Irvin B. Murray,** geologist, The California Co., Waynesboro to Forrest, Miss.; **John A. Van Auken,** engineer, Marine Exploration Co., Waynesboro to Forrest, Miss.; **Paul R. Waddle,** engineer, The Carter Oil Co., Great Bend, Kans., to Magnolia, Ark.; **Amil A. Anderson,** geologist, Neville G. Penrose, Inc., Newcastle to Casper, Wyo.; **J. C. Coogan,** engineer, Sohio Petroleum Co., Pauls Valley to Edmond, Okla.; **Jack Gardner,** foreman, Carter Oil Co., Pauls Valley to Purcell, Okla.

DEATHS

Dr. Willard Henry Dow, 52, president of Dow Chemical Co., was killed March 31 in an airplane crash near London, Ontario, Canada. His wife also died in the accident which took place during a flight to Boston, Mass. Dow, a graduate in chemical engineering at the University of Michigan, became president of Dow Chemical in 1930. He was also president of Dowell Incorporated, Iowa-Dow Chemical Co., Cliffs Dow Chemical Co. and Ethyl-Dow Chemical Co.

Dr. Friedrich Bergius, 64, German scientist who received the Nobel prize for chemistry in 1931 for his work on a high-pressure hydrogenation process to convert coal to liquid fuels, died March 30 in Buenos Aires, Argentina. He also is credited with developing petroleum hydrogenation, along with various other synthesis processes. He went to Argentina in 1948 and was employed as a technical adviser in the Ministry of Industry, combustibles division.

John Irwin, 69, president of Canadian Oil Companies, Ltd., and founder of Frontenac Oil Co., died March 31 while en route to Toronto, Ont., Canada. When Frontenac Oil was merged with McColl Co. in 1928, Irwin became president of McColl-Frontenac Oil Co., Ltd., continuing in this position until 1938 when The Texas Co. acquired control.

Herschel Eugene Denton, 41, managing director, General Petroleums, Ltd. (Canada), and president of Superior Oils, Ltd., died March 30 in Calgary, Alta., Canada. He served with Ohio Oil Co. as field superintendent in Wyoming and Montana fields prior to 1938.

Martin Yates, Jr., 67, Artesia, N. M., who was credited with being one of the discoverers of the Artesia field, died April 2 in Artesia.

Arnold Heinrich, 40, pump operator for Warren Petroleum Corp., at a butane-propane-gasoline refinery near Madill, Okla., and **Jesse H. Green,** 48, plant chemist, were killed recently in an explosion at the refinery.

Dr. Charles W. Honess, 63, geologist with Gulf Oil Corp. for 22 years, died March 28 in Evansville, Ind.

Walter S. Oliver, 59, supervisor of Louisiana interests for Kerr-McGee Oil Industries, Inc., died March 31 in Tulsa.

Will Carroll, 70, retired division manager, The Texas Co., died March 28 in Dallas.

W. D. Moore, Texas oil operator and cattleman, died March 29 in Lockhart, Tex.

Joe Harlan Neville, Jr., 45, party chief for two crews of Robert H. Ray Geophysical Co., Houston, died February 25 in Beirut, Lebanon.

J. W. Martin, 64, retired electrician for Gulf Oil Corp., died March 26 in Houston.

B. T. Brown, 67, Oklahoma oil operator and secretary of Geolograph Co. Inc., died March 25 at Shawnee, Okla.

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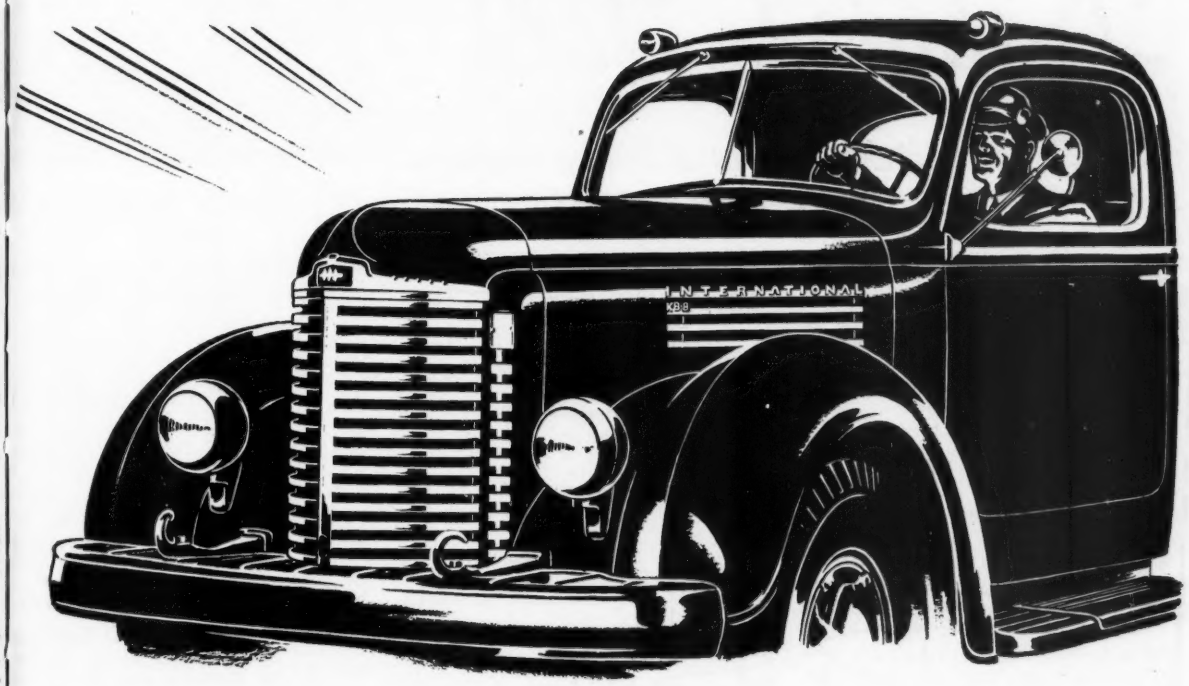

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Truck "B"	**14.3%**
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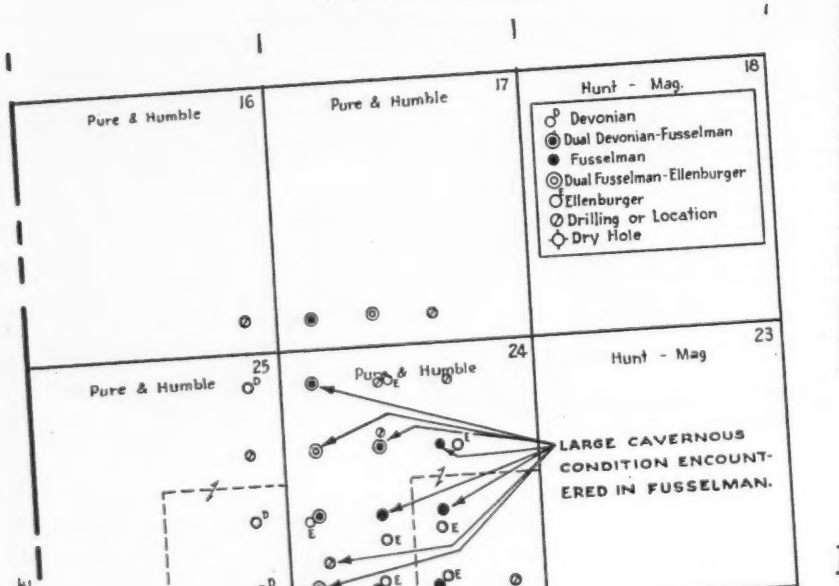
Huge Caverns

Encountered in

Dollarhide Field

Make for Unusual Drilling Conditions

by D. H. Stormont



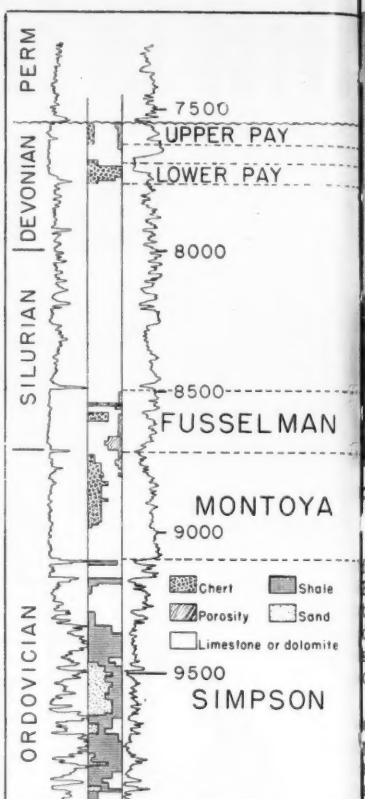
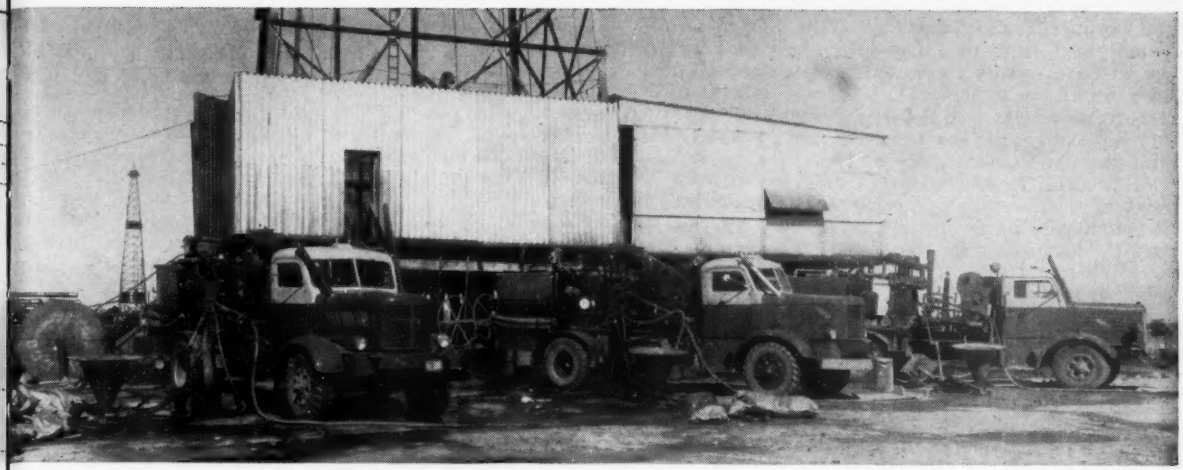


Fig. 1—Log of the pre-Permic section drilled by the Ellenbur er discovery well, Pure Oil C 1-E E. P. Cowden-A (after My dal)

IN Dollarhide field in southwest An drews County, West Texas, un usually cavernous conditions hav been encountered at several well drilled by Pure Oil Co. in developin the Fusselman pay zone and in drill ing through this section to the deepe Ellenburger pay. In some instance the drilling bit has dropped only a few inches; in other wells, voids a much as 16 ft. have been penetrate with the bit touching nothing. If th well being drilled was to be complete in this Fusselman section, all was wel

Fig. 2—Map of Dollarhide field in southwestern Andres County, Texas, showing the pays being produced by each well and the wells at which cavernous conditions were encountered in the Fusselman pay. (Base map courtesy Southwest Map Co., Fort Worth)



Cementing operations at Pure-Humble 16-E Cowden, the second well to be drilled through the cavernous system for completion in the deeper Ellenburger pay

for the cavernous system is full of oil. But, if the well was to be carried to the Ellenburger pay, some 1,500 ft. deeper, steps had to be taken to restore mud circulation so that drilling could be continued.

When true cavernous conditions are encountered it has been Pure's experience that circulation cannot be restored by the usual methods of adding solids or filler materials to the drilling fluid. The huge size of the caverns makes this impossible. The company, therefore, has adopted a method of "dry" or lost-circulation drilling for cutting the hole to sufficient depth below the cavern so that a string of casing can be cemented. Before discussing this method, however, some general information of Dollarhide field might be in order.

The field is located some 9 miles east of Jal, N. M., and is bordered on the west by the Texas-New Mexico state line. First oil production was opened in August 1945 from a Devonian pay at about 7,900 ft. Early in 1947 the 8,500-ft. Fusselman section was found to be oil productive, and late in 1947 the Ellenburger, at about 10,000 ft., was added to the list.

These pre-Permian pays are the field's main producing horizons, but in some areas oil production from the Wichita-Albany zone of the lower Permian is regarded as highly probable. A middle-Permian pay also was indicated late in February by Union Oil Co. 1-H E. P. Cowden on the extreme southern end of the field. This well, a west offset to an unsuccessful Permian test which was drilled in 1938, developed a considerable show of free oil on a drill-stem test of the Clear Fork section at 6,650-6,770 ft.

Data on Pre-Permian Pays

Log of the pre-Permian section encountered by the first well drilled to the Ellenburger, Pure and Humble 1-E Cowden-A, is shown in Fig. 1. This section, prepared by Pure's assistant chief geologist K. A. Mygdal, is fairly representative of that drilled by other wells in the central part of the field. General data concerning these three pays, according to Mygdal, are as follows:*

Devonian. — Immediately underlying the Permian, at a depth of about 7,500 ft., are the Devonian pays consisting of chert interbedded in limestones. The oil is present in very fine-grained porosity in the chert, in fine fractures, and in porosity in the associated dolomitic limestone. These beds extend over most of the structure, with some variation in thickness (average is about 90 ft.) and considerable variation in porosity and permeability. Permian beds lie unconformably on the Devonian pays, with the seal being provided by a 20 to 30-ft. section of dense Permian limestone. The oil-water contact is found down structure some 900 ft. below the crest. The oil has a gravity of 37° to 45° A.P.I.

Fusselman. — The Fusselman pay zone, found at about 8,500 ft., is formed by a zone of intercrystalline porosity, containing secondary fracture and solution channels. The producing section, averaging about 300 ft. in thickness, lies in the lower part of the Silurian and in the upper part of the underlying Montoya limestones. Its seal is provided by the overlying limestone, which appears to have no porosity below the Devonian chert section. Oil in this pay zone has an A.P.I. gravity of 41° to 43°. The oil-water contact lies at about 5,521 ft. subsea (elevations vary from 3,135 to 3,170 ft.) which is approximately 500 ft. below the crest of the anticline.

The caverns encountered in this pay are believed to have been formed by rainfall and underground water before the inundation of the Central Basin platform island by the Permian sea. The fact that wells on nine 40-acre drilling units have encountered the cavernous system indicates the Dollarhide cavern to be one of the largest so far found in

Diesel-electric rig at work on a Dollarhide well

*K. A. Mygdal, "The Geology at Dollarhide Field," Pure Oil News, January 1949. p. 8.

the Permian basin. Some idea of its extent may be gained from Fig. 2, on which all wells encountering the true cavern are indicated.

Further insight as to the immensity of the Dollarhide caverns may be gained from Bybee's study of Carlsbad Caverns, located about 75 miles west in New Mexico.† In applying a hypothetical 10-acre drilling pattern (660-ft. locations) to the Carlsbad area, he found that of all the wells necessary to complete the development of the area overlying the caverns, only four would penetrate the main rooms. Several others would be located close enough that a crooked hole might or might not enter a room. At Dollarhide, nine wells have encountered cavernous conditions in the Fusselman, eight of which were on 40-acre spacing.

Ellenburger.—The dolomitic limestone pay in the Ellenburger, found at about 10,000 ft., is believed to be the most important of the three pays. The porosity system consists almost entirely of solution channels, many of which are more than 1 in. across. The relatively large size of the openings and the thickness of the pay section, averaging some 200 ft., assure high ultimate oil recovery.

As in the Fusselman, the oil-water contact is about 500 ft. below the highest position of the Ellenburger on the crest of the structure. The 700 ft. of dense shale in the overlying Simpson formation provides the seal for the Ellenburger reservoir. Average oil gravity is about 43° A.P.I.

At the first of March about 72 wells had been completed, proving an area of around 3,000 acres as shown in the accompanying map (Fig. 2). Of these producers, 21 were completed in the Ellenburger pay, 3 dually in the Ellenburger and Fusselman, 3 in the Fusselman, 18 dually in the Fusselman and Devonian, and 27 in the Devonian. Some 18 rigs were drilling, of which Pure was using 8 in developing the 2,560-acre lease jointly owned with Humble Oil & Refining Co.

The casing program used by Pure is to set about 375 ft. of 13⅜-in. surface pipe in a 17¼-in. hole. A 9⅝-in. string is then set at around 3,000 ft. and cemented to the surface with 2,000 sacks of cement. Open 8¾-in. hole is then carried to the Devonian and/or Fusselman, and to the Ellenburger if no caverns are encountered. Average time for completing the Ellenburger wells is 120 days.

Drilling Ellenburger Wells

In developing the Devonian and Fusselman pays, Pure and other operators have adopted the practice of dual completions wherever both pays are present, with twin wells then being carried to the Ellenburger. To date Pure has completed a total of 18 wells at Dollarhide, of which 9 have been completed in the Ellenburger.

†A.A.P.G. Bulletin, July 1938, p. 915, Vol. 22, No. 7.

Of these nine wells only two encountered cavernous conditions in drilling through the Fusselman section. Six other Pure-Humble wells encountered the cavernous system when being completed in the Fusselman. On its lease to the south of the Pure-Humble block, Humble 10 Cowden also drilled into the cavern.

The two Ellenburger wells above mentioned encountering the cavern were drilled on 40-acre units on which wells already had been completed in the Fusselman. In an effort to miss the cavern they were drilled as far away from the existing producers as well-spacing regulations would permit, and in the direction which was believed to be away from the cavernous system.

When the cavernous section was encountered and circulation lost, effort first was made to restore circulation through use of Fibrotex, Gelflake, and Palcoseal. As had been experienced at other wells which were drilled into the cavern it was impossible to restore circulation. Formation pressures in the Fusselman are not exceptionally high so that despite the drilling fluid dropping to a level of around 1,170 ft. from the surface, neither well exhibited a noticeable tendency to blow out. To assure that they would not blow out, however, approximately 2 bbl. of mud per hour were pumped into the hole.

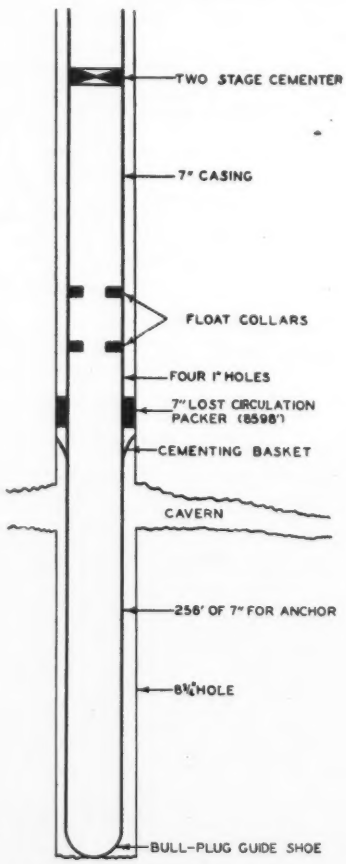


Fig. 3—Sketch of the method used in cementing off the portion of the hole above the cavern. The cementing operation is accomplished in three or four stages

At Pure 16-E Cowden-A, the second Ellenburger well to encounter the cavern, lost-circulation drilling was used to drill below the cavern. (The method had been used previously at one other well, Pure-Humble 8-E Cowden-A.) As at the first well, light mud or water was pumped down the hole to wash the cuttings from around the bit back up into the cavern. Rotary speeds of about 45 r.p.m. were maintained and about 45,000 psi. carried on the bit.

This lost-circulation drilling was continued at the 16-E Cowden until about 200 ft. of 8¾-in. hole had been dug below the cavern. The drill pipe was then pulled, the hole calipered and preparations made for cementing a 7-in. casing string through the cavern.

The casing string was made up so that a lost-circulation packer would land at 8,598 ft., about 30 ft. above the cavern and at a point where a firm wall section was assured. As shown in Fig. 3, a metal-petal basket was placed immediately below the packer, and four 1-in. circulation holes cut in the casing about 13 ft. above the packer. These holes were cut so that they sloped upward at a 45° angle toward the outside, the purpose being to create an upward flow in the cement upon leaving the casing.

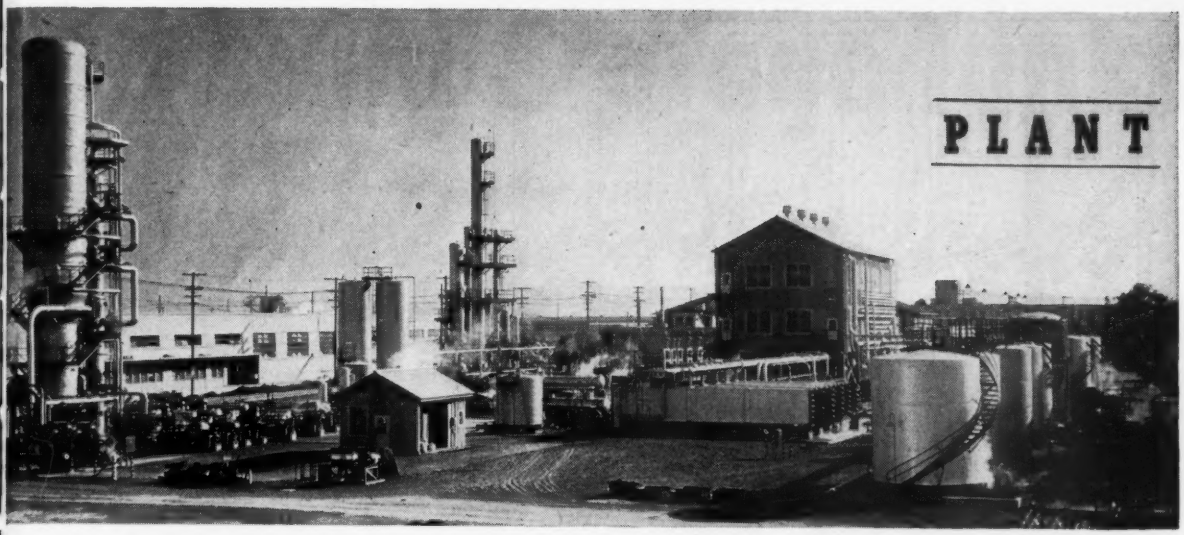
One float collar was placed 33 ft. above the packer and another 59 ft. above the packer. A two-stage cementing tool was placed in the casing string 273 ft. above the packer. Additional metal-petal baskets, casing centralizers, and a drillable bull-plug guide shoe also were placed in the string.

Having prepared the casing in this manner the string was set on bottom with about 40,000 psi. weight. Circulation of fluid was started and continued until it was assured that the packer was holding. First-stage cementing operations for sealing off the cavern were then started.

For the first stage only a relatively small amount of cement could be used because of the danger of washing by the packer. From the hole caliper data, therefore, the volume of cement necessary to give a column only some 300 ft. above the packer was calculated to be 90 sacks.

This volume of cement was pumped down the hole, followed by a bypass top plug. Then 6½ bbl. of mud, the volume calculated to fill the casing from the top float collar to the bottom of the cementer, was pumped down the casing followed by the cementer opening plug. With the cement displaced behind the casing, and the ports of the cementer opened, circulation was maintained until any excess cement above the cementer port was circulated from the hole.

(Continued on page 94)



Capacity of this new wax plant of Standard Oil Co. of California is rated at 45,000,000 lb. per year

West Coast Gets New Wax Plant

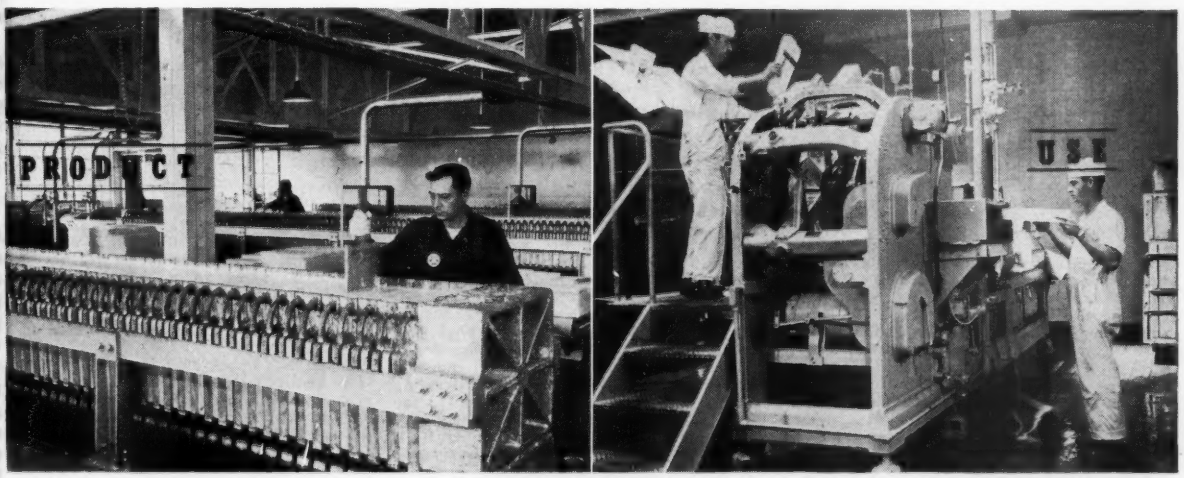
A NEW, major wax plant for the Pacific Coast and the West is now in production at the Richmond refinery of Standard Oil Co. of California. The new plant has been under construction since the easing of the equipment and supply situation following the end of the war. It is capable of manufacturing 45 million pounds of wax a year. Need for a West Coast wax plant has been indicated since the tremendous growth in the use of wax during and since the war years.

The new plant will produce refined wax of high, medium and low melting points from California crude. Shipment from the Richmond refinery is made in 10-lb. slabs, 100-lb. cartons of slabs and 220-lb. bags of slabs. Loose slabs can be shipped in paper-lined box cars. Bulk shipments are in steam-coil tank cars direct from the refinery.

About 29 per cent of production will be low-melting-point grade, 125 to 130 a.m.p. (American melting point) most of which will be used in milk cartons. Around 54 per cent will be of medium melting point for waxed paper, which has an almost endless range of usefulness in industry and food processing and wrapping. Higher-melting-point wax will be used for specialized purposes.

Uses of wax in modern living are constantly growing. Besides the more familiar tasks of shining shoes, providing candlelight, and sealing jams and jellies, petroleum wax is the binding agent in carbon paper; seals cheese; is an essential ingredient of many cosmetics, matches, and medicines. It waterproofs leather, rope and cordage; insulates electric wires, and waterproofs everything from an awning to a wrapper for dynamite.

The new plant is big, and although the method used is derived from known basic processes, solvent-recovery units and their auxiliaries make it relatively complicated. Slack wax, a mixture of various oils and waxes produced as a refined byproduct in the manufacture of lubricating oil, is separated into the three different melting points. Further steps remove the oil from the wax by chilling, solvent treating, and filtering. Final step passes the wax through fine clay, resulting in an end product of semi-translucent whiteness, tasteless, and odorless.



Left: Here are the slabbing machines for the new plant at Richmond. Right: Much of the finished wax produced in the new plant is used for coating food containers. One of the operators of this milk-carton coating machine is placing a 10-lb. slab of wax into the machine's melting chamber

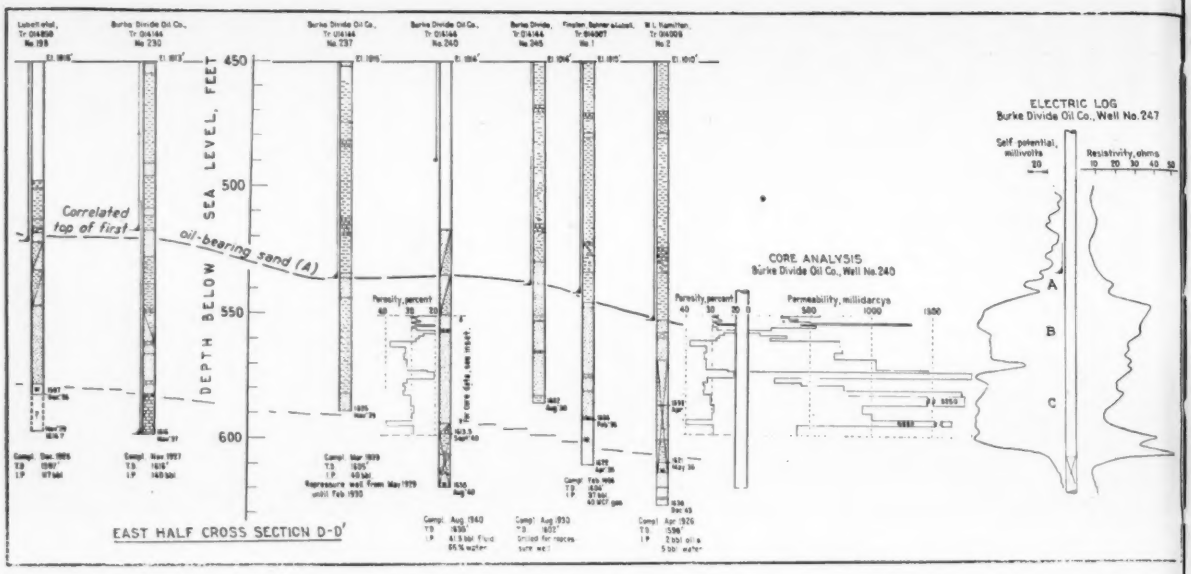


Fig. 1—Cross-section of wells, core analysis, and electric log, illustrating pay conditions. Map of field is shown on page 77

West Red River Field, Okla.

Operating Practices Used Have Included Natural Depletion, Vacuum, Repressuring, Water Injection

by H. B. Hill, Kenneth H. Johnston†, T. L. Coleman‡, and J. M. Seward***

Introduction

IN this discussion of West Red River field,¶ the Bureau of Mines has recorded salient information on a field whose development in some respects was unique as compared with other fields discovered and initially developed more than a quarter of a century ago. Total oil production from government-operated leases considered in the report was 6,900,440 bbl. to January 1, 1947, from 321 proved acres developed by 81 producing oil wells, 10 gas-injection wells, and 5 nonproductive wells. A calculated past recovery of 608 bbl. of oil per acre-foot and an estimated ultimate recovery of 660 bbl. of oil per acre-foot under gas-injection methods begun in 1929 is shown.

Before the last price increase (on December 6, 1947) in crude oil, the wells in West Red River field virtually reached their economic limit; and before they reach their economic limit at the increased price major changes in operating methods will become necessary to recover additional oil. Present repressuring operations probably are not producing the maximum results, and new operations must be planned to retard and reduce bypassing of gas to a minimum and to force the repressuring medium into less depleted drainage areas. Possibilities of applying water-flooding methods are suggested.

Geology of West Red River

Structure.—The oil-bearing formations in West Red River field are the Gunsight sands in lower Cisco formations at depths ranging from 1,550 to 1,600 ft. below the derrick floor. The producing closure as defined by the —560 and —480 ft. below-sea-level contours, is approximately 80 ft.

Producing zone.—The oil-saturated

*Senior petroleum engineer, U. S. Bureau of Mines, Dallas. †Petroleum engineer, U.S.B.M., Bartlesville, Okla. ‡Petroleum engineer, U.S.G.S., Oklahoma City. **Principal engineering draftman, U.S.B.M., Dallas. This article is a condensation of Bureau of Mines Report of Investigations No. 4450; the paper was a feature presentation at the North Texas Oil and Gas Association's annual meeting and secondary-recovery forum, Wichita Falls, March 25-26.

¶West Red River field in Tillman County, Oklahoma, is one of a number of fields in the North Texas area on the Electra arch. The pre-Pennsylvanian formations in the area, from Petrolia, in Clay County, Texas, westward to Electra, in Wichita County, Texas, have been raised above their counterparts in the adjacent areas, and over the resulting "high," the Pennsylvanian formations have been altered in many ways. Most of the alterations have resulted in prolific oil-bearing reservoirs at comparatively shallow depths.

The discovery well was completed November 10, 1919, at a depth of 1,555 ft. with an initial production of 1,600 bbl.

Oklahoma and Texas each claimed the land between the medial line and the south bank of the Red River overlying the oil field. The dispute was taken to the U. S. Supreme Court in December 1919, and a receiver was appointed April 1, 1920. A large part of West Red River field was developed under his supervision. Operation of the field was transferred to the secretary of the interior as trustee, July 1, 1924, to be operated by the Bureau of Mines until the claims were adjudicated, leases granted, and the properties returned to the owners. This supervision ended December 1, 1925. Subsequent to that date operations were under the supervision of the Federal Geological Survey, as the land between the medial line and the south bank of the Red River had been declared to be public domain.

From November 1919 to January 1, 1921, six producing wells had been drilled. Twenty-five additional wells were completed in 1921. A surface area of approximately 150 acres was developed by the first 31 wells (in upper half of the producing sand). The productive area was increased by additional wells in 1926 and later to 327 acres. Many of the wells were deepened subsequently and recompleted.

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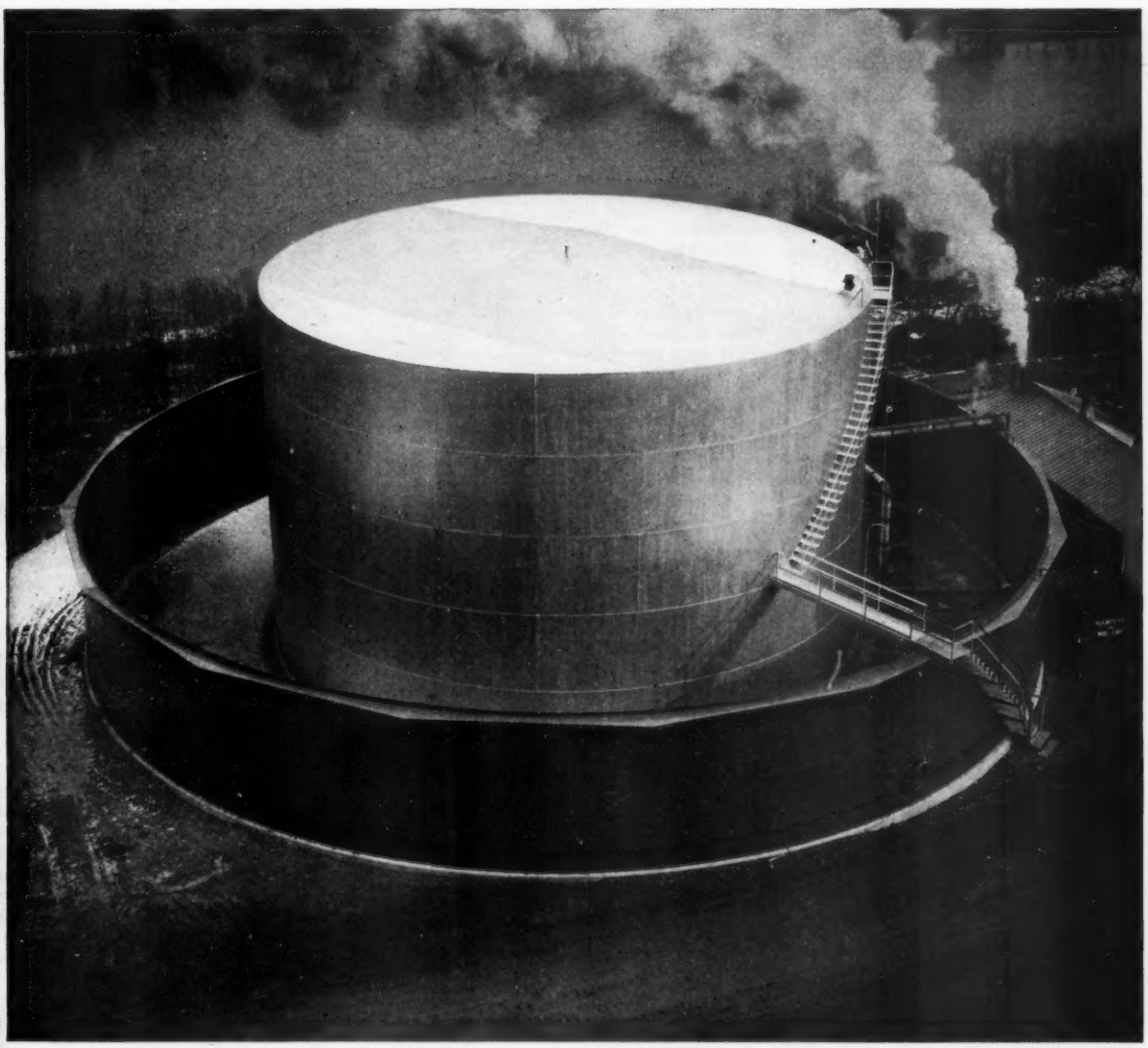

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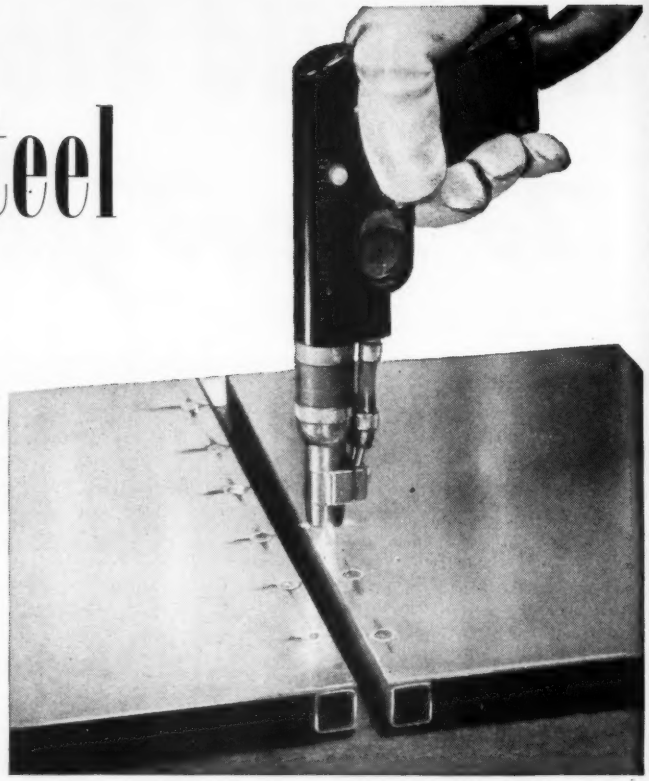

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sandstones of relatively high permeability and porosity in the oil-producing zone of West Red River field vary in thickness and are lenticular in character. Shale and sandstone of low permeability separate the oil-bearing sands.

As the producing section in the early-drilled wells was believed to consist largely of sandstone 25 to 30 ft. thick separated by relatively thin shale partings and sandy shale formations of varying thickness, the first wells were completed near the bottom of the upper half of the oil-producing section in a highly oil-saturated sandstone 10 ft. or more thick.

Subsurface conditions for a line of wells in an east-west direction across the field are interpreted by cross-section D-D', Fig. 1, on which the original depths of the wells are marked O.T.D. Six of the 20 wells shown on the cross section were completed in 1921; one in 1922; one in 1923; two in 1924; four in 1926; one in 1928; three in 1929; and two in 1930. Some of the wells were drilled and cased purposely for repressuring operations. Most of the wells in the field were deepened several times. The large number of times the oil-bearing formation in the wells was shot with nitroglycerin and dynamite, and the results obtained, suggest that shooting to increase the production of oil generally was very successful.

The producing strata are divided by shale and limestone breaks that are fairly regular in thickness and occurrence, and they can be correlated with some assurance in wells throughout the field.

The productivity of the wells probably is due to local sand conditions rather than to structural position. Wells on the crest of the structural "high" are relatively small producers, but where the sandstone is thicker, and conditions controlling the accumulation of oil are apparently better on the east and south flanks of the structure, wells produced the most oil. Apparently the oil-bearing strata grade into sandy shale and shale near the outer limits of the field, and a definite water level was not recognized in the oil-producing strata. Low-head, low-volume water was observed in the early days of the field in some of the wells at a depth of about 1,535 ft., but later no water was reported in any strata at depths above 1,555 ft. By January 1947, most of the wells were producing only relatively small quantities of water, if any.

Production Statictics

Statistics of oil production for West Red River field are shown in Fig. 2. The rate of decline in oil production between 1920 and 1946 was very well sustained and peaks were reached by drilling new wells, deepening old wells, shooting oil-bearing formations, and returning gas to the producing strata through injection wells. From

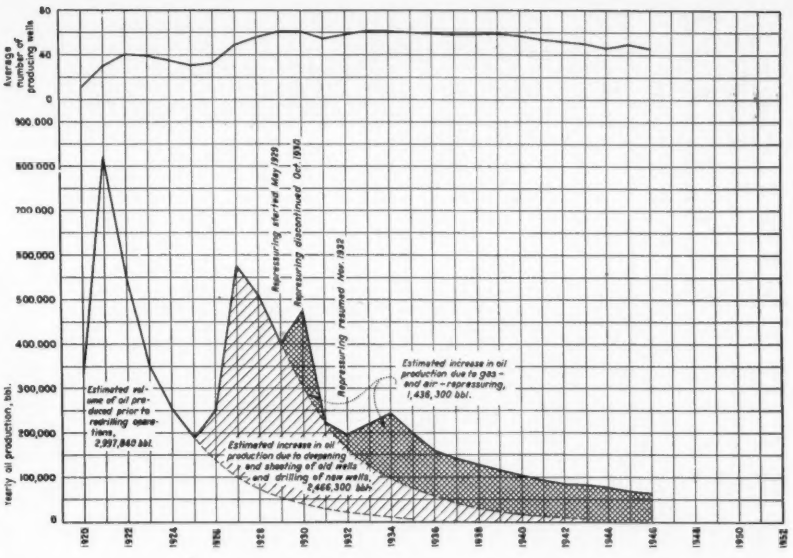
Average number of producing wells
Yearly oil production, bbl.
Repressuring started May 1929
Repressuring discontinued Oct. 1930
Repressuring resumed Nov. 1933
Estimated increase in oil production due to gas - and air - repressuring, 1,436,300 bbl.
Estimated volume of oil produced prior to restriking operations, 2,297,840 bbl.
Estimated increase in oil production due to deepening and shooting of old wells and drilling of new wells, 2,466,300 bbl.

Fig. 2—Yearly oil production and the estimated increase of oil due to gas and air-repressuring operations, West Red River field

October 1933 to January 1935 approximately 48 million cubic feet of air was added to the produced gas for make up purposes.

Gas in solution in the oil furnished the principal force to drive the oil to the wells in West Red River field. Reservoir study of the field indicated that the flushing effect of water was of minor importance in the recovery of oil from the lenticular oil and gas-bearing sands comprising the reservoir. Close relationships were observed between rates of oil and gas production, and if wells were shut in for varying periods of time a noticeable decrease occurred in the production of gas. Daily oil production lost when the wells were not producing was made up later in some of the wells.

Vacuum Operations

Soon after the first wells were completed in West Red River field, plans were initiated to conserve and process the casing-head gas. Gas traps were installed at the tank battery of each well, and at a few wells, gas traps were installed on the derrick floor. A low vacuum equivalent to 3 to 5 in. of mercury was applied at the trap. In general, the operators favored the use of relatively low vacuum on the well heads, as considerable difficulty was experienced in some of the wells from caving formations, sand cutting leather cups, and channeling when high vacuums were applied at the well heads. Although pumping operations were satisfactorily conducted under vacuums of 11 to 12 in. of mercury at the well heads, vacuums of approximately 20 in. of mercury were applied to the casing heads of many wells in the river bed immediately before repressuring operations were begun.

Wells were operated under vacuum from 1921 to 1930, and during that period 4,379,044 bbl. of oil was produced by the wells in the field, with no detrimental effects being observed. The purpose of applying vacuum to the wells primarily was to conserve "rich" low-pressure reservoir gas collected at the casing heads and gage tanks, so that valuable hydrocarbon liquid could be extracted from it in the absorption plant.

Repressuring Operations

Repressuring operations were begun in 1929, when cooperative agreements were made between Bell Oil & Gas Co. and other operating companies to repressure the pool as a unit. The agreement was in effect until March 1931, when repressuring operations were discontinued. In 1933 gas injection was resumed under another plan.

The initial objectives of repressuring were to inject gas into the lower strata of the producing section (using packers on 2-in. diameter tubing at the input wells) and to raise the fluid levels in the wells high enough to cover the producing sand and thus prevent bypassing of gas through dry and partly depleted oil-bearing strata.

Twelve wells were drilled in the field for repressuring during 1929 and 1930. The top of the producing oil sand was located in all of them by coring the full section of reservoir formation. The cores indicated that the oil-producing section in the wells near the center of the field on the southeast flank of the structure was approximately 70 ft. thick, most of which was sandstone, and that the shale and limestone partings were relatively thin and minor in importance.

Because vacuum operations had been in effect for a long time, relatively low pressures were required

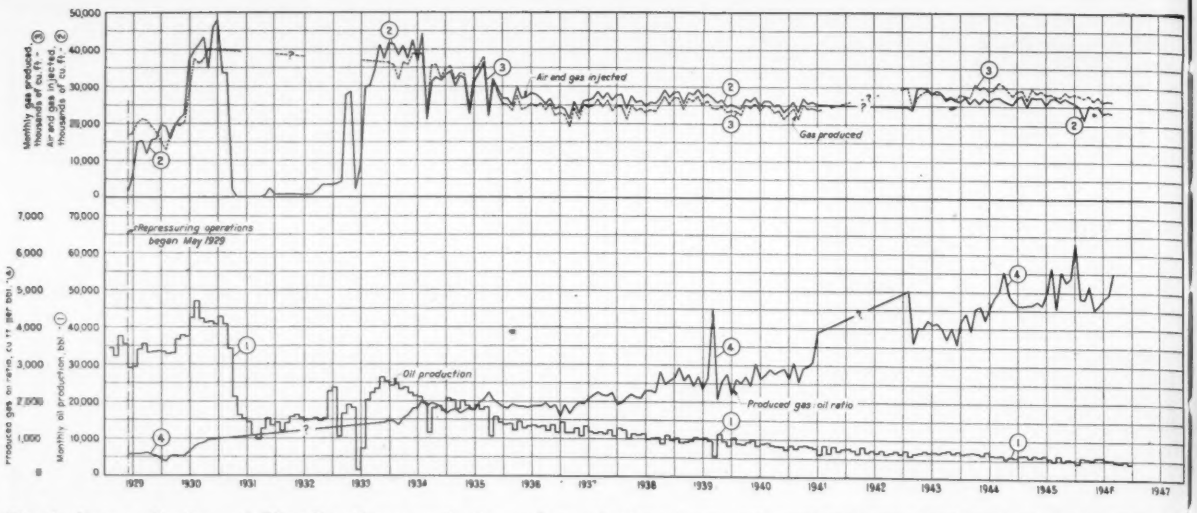

Fig. 3—Curves showing monthly oil and gas production, volume of injected gas, and produced gas-oil ratios, West Red River field

initially to inject gas into the producing strata through the gas-input wells. In fact, gas was returned to the producing formation at a "back" vacuum of several inches in some of the wells. This "suction condition" was overcome gradually as pressures were built up in the producing strata. By January 1, 1930, the average vacuum at the casing heads of the wells was approximately 1 in. of mercury, and by April 1, 1930, all vacuum operations had been discontinued.

Injected Volumes

The volume of gas injected was increased from approximately 60,000 to 200,000 cu. ft. daily during the first 6 weeks of operation, and a noticeable increase in the oil-production rate was observed at some of the producing wells offsetting gas-input wells. As a result, the volume of injected gas was increased further to 500,000 cu. ft. daily. The results of injecting this volume of gas were not satisfactory, and the increase in gas-oil ratios indicated appreciable bypassing of the input gas through the depleted sandstone formation in the upper part of the oil-producing sand section. Orifice plates were placed in the gas gathering lines of the producing wells in which bypassing (as measured by gas: oil ratio standards) was considered excessive. Also stopcocks were installed in the gas line of adjacent input wells and regulated so that only enough gas was injected to give normal gas-oil ratios in the producing wells.

The tubing was raised in several wells in an attempt to raise the fluid level high enough to retard or prevent channeling of injected gas to the wells. This method could not be applied throughout the field, because common operating agreements among ownerships of the producing properties could not be reached.

The results obtained by setting packers in an attempt to confine input gas to the part of the sand section that was to be repressured were unsatisfactory because the packers could not be set tightly in open formation shattered by shooting.

Gas-input wells were equipped with pressure regulators, needle valves or stopcocks, and meters to measure the volume of the injected gas. Positive-displacement meters were used at wells in which the volume of injected gas was small. Orifice-type meters were installed in which the volume of the gas injected exceeded 40,000 cu. ft. a day.

It was desirable to inject approximately equal volumes of gas into all gas-input wells to avoid differential pressures between areas which might create reservoir conditions that favored one operator more than another. Gas-input wells were at fairly regular intervals throughout the area. It was believed advisable to drive the oil from the edge of the field toward the more productive wells in the central part, where sand conditions were more favorable for maximum recovery of oil.

During the early repressuring operations, a gradual increase in the volume of produced gas was observed, and the gravity of the oil increased from 1° to 3° A.P.I. The repressuring operations resulted in a higher daily oil production at a lower operating cost per barrel and a substantial increase in the ultimate recovery of oil. Results of repressuring operations in West Red River field from May 1929 to December 1946, given in Fig. 3, show graphically (1) monthly oil production, (2) volumes of gas returned to the reservoir formation, (3) volumes of gas produced, and (4) produced gas-oil ratios.

Special Input Wells Drilled

Repressuring operations in West Red River field in general were not satisfactory until special gas-input wells were drilled and cased to confine the input gas to a 25 to 30-ft. stratum of oil-bearing sand near the base of the producing formation. Operations in the field showed that restoration and control of reservoir pressure could be accomplished only by the unified agreement of the operating companies to raise and maintain fluid levels. Pump barrels subsequent to 1926 were set near the bottom of the hole, and relatively low fluid levels predominated throughout the repressuring period.

The increase in the volume of oil produced from repressuring was estimated to be 1,436,300 bbl. for leases in West Red River field. A peak volume of 8,551,000 cu. ft. of gas for makeup purposes (including fuel for the compressor plant, central powers, and lease purposes) was purchased in August 1933. From 1934 to 1947 approximately 3.5 to 4 million cubic feet of makeup gas was purchased each month, of which about one-half was utilized as fuel for field operations.

The average volume of gas produced daily in November 1947—injection gas plus solution gas—was approximately 680,000 cu. ft., or about 20,400,000 cu. ft. a month. In September 1947 the average volume of gas injected a day was approximately 686,070 cu. ft. or 20,580,000 cu. ft. a month.

Water Injection Experiment

Well 242, completed in February 1930, was used as a gas-injection well from March 1930 to November 1939. In June 1940, well 242 was converted to a water-input well and was used for that purpose until January 18, 1941. Afterward, well 242 was reconditioned, and an attempt was made to cement off the upper producing formation (sands A and B, Fig. 1) so that the input water could be confined to the oil-bearing formation (sand C, Fig. 1) near the base of the producing section.

The flood project was begun by injecting 210 bbl. of water daily. At the end of 5 days the hole was full

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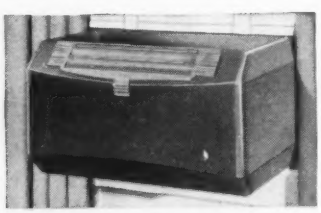

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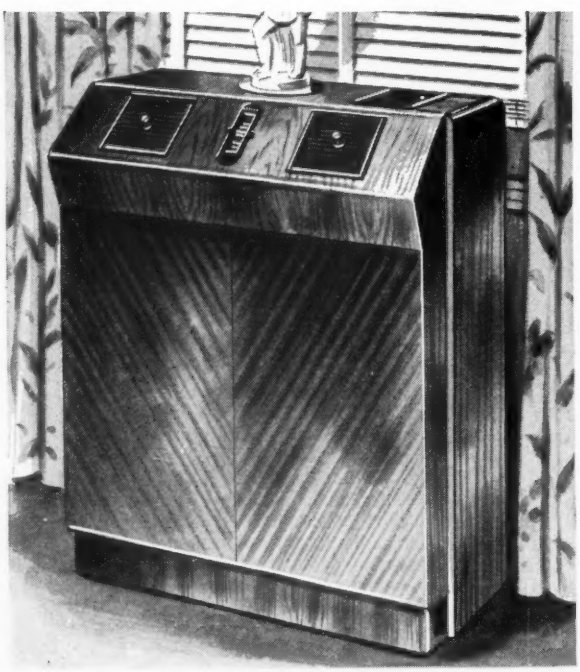

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f water; and after that time, pressures of 200 to 350 psi. were required o inject approximately 125 bbl. of ater a day. Approximately 50,000 bl. of water were injected into well 42 from June to October 1940. No ncrease in either oil or water production was noted in the offset wells, which were pumped once each week or test purposes.

Following the workover job in February 1941, several attempts to flood he producing sands through input ell 242 were unsuccessful, and the roject was abandoned.

The lenticular nature of the oil-earing strata, comprising the producing formations, the channeled conditions indicated by high gas-oil ratios, and the age of the mechanical quipment all combine to make water-flood operations in West Red River field an interesting but speculative experiment.

The long repressuring history and he need for continuing to inject gas o obtain the daily production at an economic rate present a number of echnical as well as economic problems. If and when a water flood (probably peripheral) is planned to recover a higher percentage of the oil remaining in the reservoirs of West Red River field, it seems likely that initially the general pattern and procedures will be to continue repressuring with gas when the water flood is initiated. In the changeover period from gas injection to water flooding, the engineering work probably will center largely in restricting the flow from some wells and shutting in others, and in gradually raising the fluid levels in the wells to retard and prevent bypassing and channeling of the gas and water.

It appears reasonable to believe that an increase in the order of 750,000 bbl. of oil—10 per cent of the estimated ultimate recovery of 7½ million barrels of oil—may be anticipated by water-flooding operations.

Recoverable Oil Reserves

Porosity, permeability, and connate-water. — The porosity, permeability, and connate-water data are based upon the analyses of cores from a few wells producing from the main oil reservoir in West Red River field. The weighted average porosity of the reservoir sand is estimated from these data to be approximately 26 per cent, and the average permeability of the producing reservoir rock about 750 md.

Based upon the analysis of six samples by the capillary pressure method, the average connate-water content of the reservoir rock was estimated to be 18 per cent.

Estimate of reserves.—Salient data regarding the development of the oil-producing reservoir in West Red River field, including the cumulative oil production, the past recovery of oil per acre-foot, the estimated thickness of the saturated formation, and the volume of the reservoir rocks, are given in Table 1.

Fig. 4 shows the calculated recovery of oil per acre-foot, by leases, the rate of daily oil production in November 1947, thickness of the oil sands, wells now producing and abandoned

(Continued on page 94)

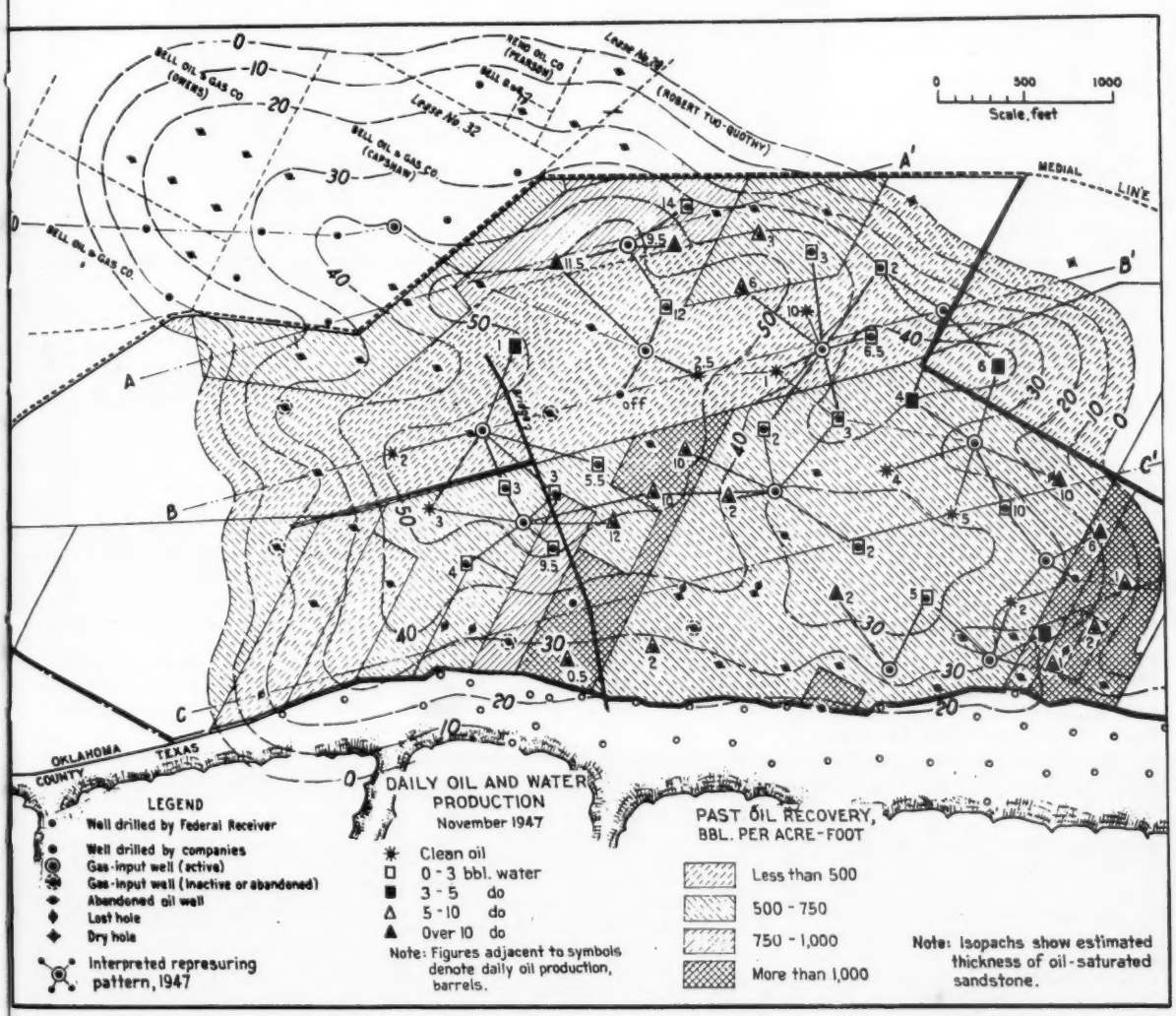

Fig. 4—Oil recovered per acre-foot by leases and daily oil and water production per well, West Red River field

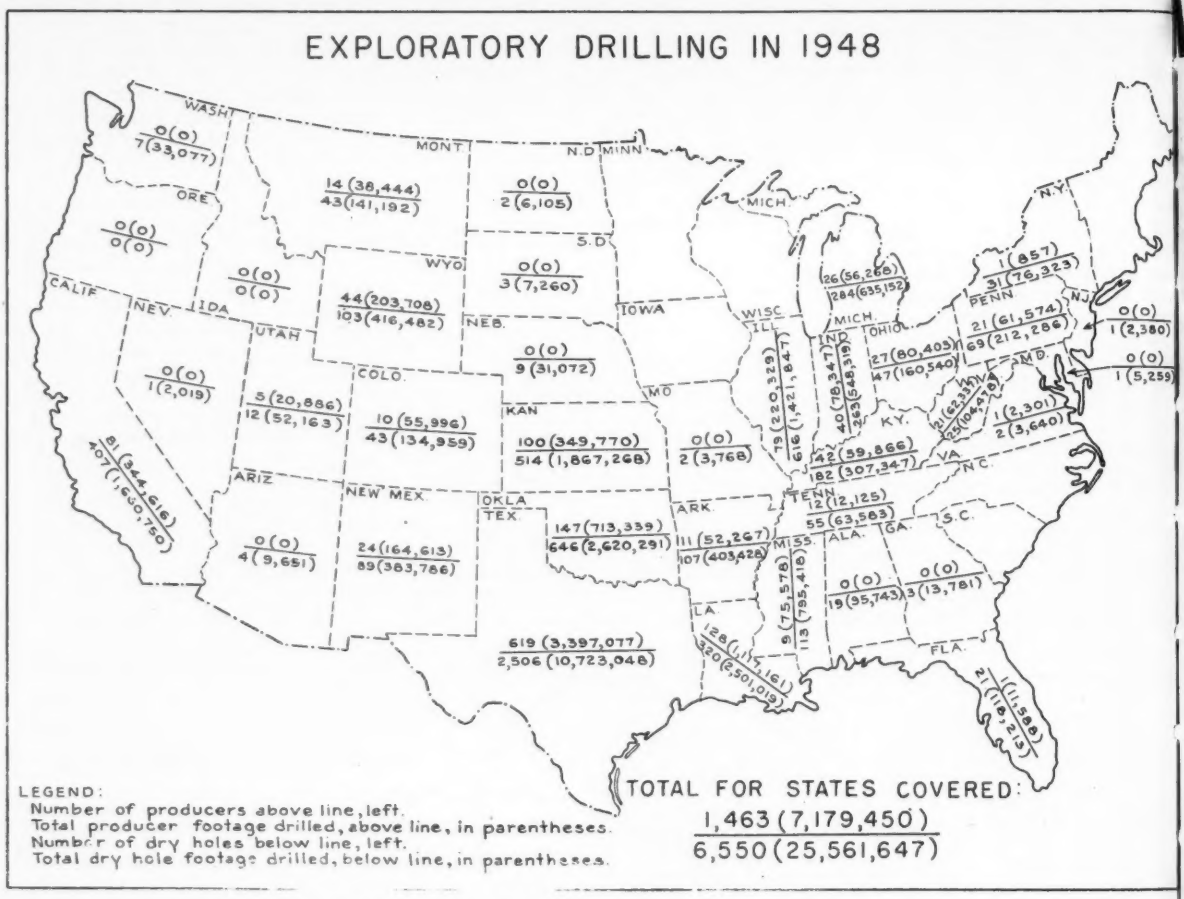

Fig. 1—State by state "score board" for exploratory drilling, as to number of producers and dry holes with footage drilled for each

Wildcat Drilling in 1948

by Frederick H. Lahee

IN the states covered in this review, as shown in Fig. 1, and listed in Table 1, during 1948 a total of 32,741,097 ft. was drilled in 8,013 exploratory holes, divided as follows:

	Ft.
1,463 producers	7,179,450
6,550 dry holes	25,561,647

This means that 18.3 per cent of the holes drilled, and 12.9 per cent of the footage drilled, were successful in 1948. One producer foot was drilled for every 3.56 ft. of dry hole. One successful well was drilled for every 4.50 dry holes. The average depth of hole was 4,086 ft.

In Table 4 are listed the reasons for drilling the new-field wildcats in 1948, by using the best information available from men familiar with such statistics, each in his own state or district. According to these figures 455 new-field wildcats drilled on technical advice (geology and/or geophysics) were successful, and 3,034 were dry; 12 holes, located for nontechnical reasons, were producers, and 372 were dry; 34 producers and 389 dry holes were located for reasons unknown. These figures show that 13.0 per cent of the holes drilled on technical advice were producers as contrasted with 3.1 per cent successful in the case of the holes located without technical advice. Therefore in 1948, locations for new-field wildcats based on technical recommendations were 4.1 times as successful as those drilled without such advice. Seismographic methods were primarily responsible for 219 producers and 948 dry holes, among the new field wildcats.

This extensive digest of the report of the A.A.P.G. Committee on Exploratory Statistics, presented at the St. Louis convention this month, is published by special permission of the author and the A.A.P.G. The full report will be printed later in the A.A.P.G. Bulletin. The author is chief geologist for Sun Oil Co.

In Table 5 are listed annual statistics comparing the American Petroleum Institute's figures on proved oil reserves with our figures on exploratory drilling. This comparison is suggestive, but it is not quite precise, and for this reason the estimated "new proved reserves" (columns C and E) include, for each year, newly discovered proved reserves and also new proved reserves resulting from extensions of pools or fields previously discovered.

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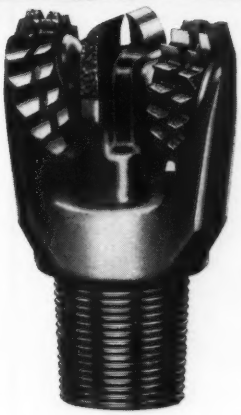

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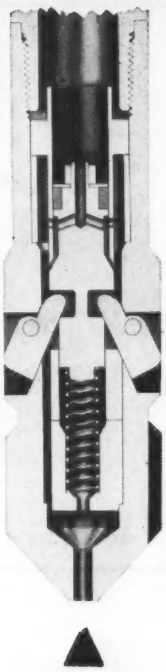

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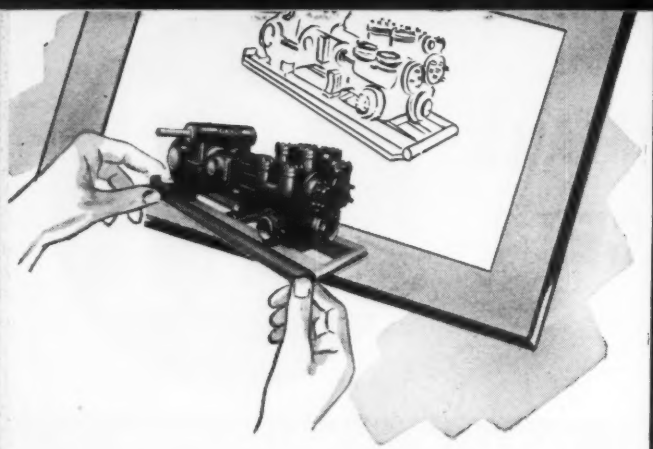

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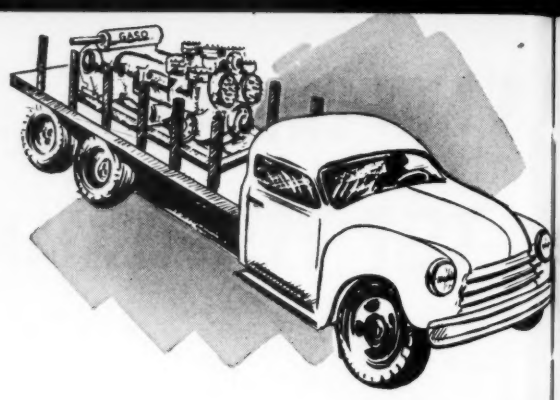

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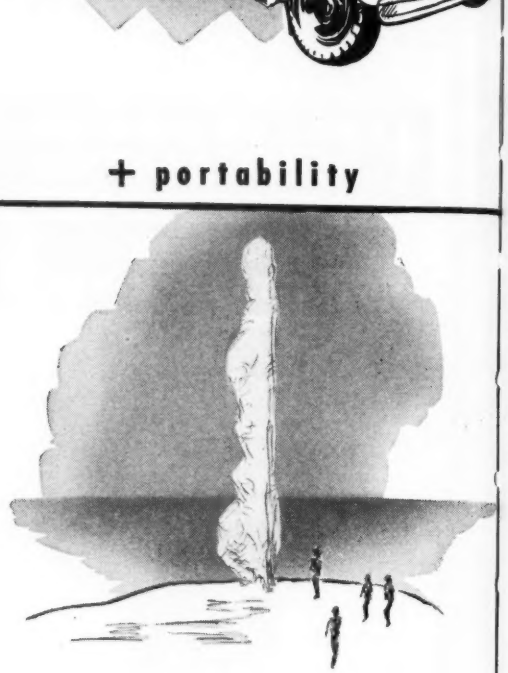
+ salvagability



+ dependability

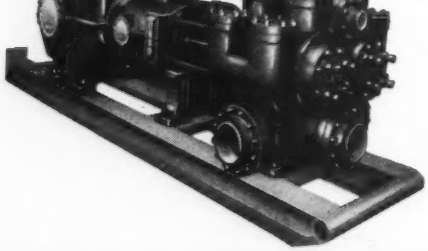


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TABLE 1—NUMBER OF OIL WELLS, GAS WELLS, CONDENSATE WELLS, AND DRY HOLES DRILLED IN THE UNITED STATES AS EXPLORATORY TESTS IN 1948

State—	Oil producers		Gas producers		Condensate producers		Total producers		Dry holes		Grand totals		Average depth of hole*
	No. holes	Footage	No. holes	Footage	No. holes	Footage	No. holes	Footage	No. holes	Footage	No. holes	Footage	
Alabama	0	0	0	0	0	0	0	0	19	95,743	19	95,743	....
Arizona	0	0	0	0	0	0	0	0	4	9,651	4	9,651	....
Arkansas	11	52,267	0	0	0	0	11	52,267	107	403,428	118	455,695	3,801
California	71	313,019	10	31,597	0	0	81	344,616	407	1,660,750	488	2,005,366	4,109
Colorado	4	23,654	6	32,342	0	0	10	55,996	43	134,959	53	190,955	3,603
Florida	1	11,588	0	0	0	0	1	11,588	21	118,213	22	129,801	....
Georgia	0	0	0	0	0	0	0	0	3	13,781	3	13,781	....
Illinois	79	220,329	0	0	0	0	79	220,329	616	1,421,847	695	1,642,176	2,363
Indiana	37	76,125	3	2,222	0	0	40	78,347	263	548,319	303	626,666	2,068
Kansas	91	310,769	9	39,001	0	0	100	349,770	514	1,867,268	614	2,217,038	3,611
Kentucky	34	46,686	8	13,180	0	0	42	59,866	182	307,347	226	367,213	1,624
Louisiana	69	554,106	14	113,225	45	449,830	128	1,117,161	320	2,501,019	448	3,618,180	8,076
Maryland	0	0	0	0	0	0	0	0	1	5,259	1	5,259	....
Michigan	22	47,973	4	8,295	0	0	26	56,268	284	635,152	310	691,420	2,230
Mississippi	5	34,618	2	19,274	2	21,686	9	75,578	113	795,418	122	870,996	7,139
Missouri	0	0	0	0	0	0	0	0	2	3,768	2	3,768	....
Montana	13	35,652	1	2,792	0	0	14	38,444	43	141,192	57	179,636	3,151
Nebraska	0	0	0	0	0	0	0	0	9	31,072	9	31,072	....
Nevada	0	0	0	0	0	0	0	0	1	2,019	1	2,019	....
New Jersey	0	0	0	0	0	0	0	0	1	2,380	1	2,380	....
New Mexico	16	122,819	8	41,794	0	0	24	164,613	89	383,786	113	548,399	4,853
New York	1	857	0	0	0	0	1	857	31	76,323	32	77,180	2,412
North Dakota	0	0	0	0	0	0	0	0	2	6,105	2	6,105	....
Ohio	9	17,075	18	63,328	0	0	27	80,403	47	160,540	74	240,943	3,256
Oklahoma	117	555,643	29	147,988	1	9,708	147	713,339	646	2,620,291	793	3,333,630	4,204
Pennsylvania	2	7,210	19	54,364	0	0	21	61,574	69	212,286	90	273,860	3,043
South Dakota	0	0	0	0	0	0	0	0	3	7,260	3	7,260	....
Tennessee	12	12,125	0	0	0	0	12	12,125	55	63,583	67	75,708	1,130
Texas	461	2,255,305	97	623,631	61	518,141	619	3,397,077	2,506	10,723,048	3,125	14,120,125	4,518
Utah	2	4,991	3	15,895	0	0	5	20,886	12	52,163	17	73,049	....
Virginia	0	0	1	2,301	0	0	1	2,301	2	3,640	3	5,941	....
Washington	0	0	0	0	0	0	0	0	7	33,077	7	33,077	....
West Virginia	0	0	21	62,337	0	0	21	62,337	25	104,478	46	166,815	3,626
Wyoming	41	180,368	2	10,324	1	13,016	44	203,708	103	416,482	147	620,190	4,219
Total	1,098	4,883,179	255	1,283,890	110	1,012,381	1,463	7,179,450	6,550	25,561,647	8,013	32,741,097	4,086

*Averages have been recorded here only for states where more than 25 exploratory holes were drilled in 1948.

TABLE 2—EXPLORATORY DRILLING IN CANADA IN 1948

Province and well classification—	Oil		Gas		Condensate		Total producers		Dry		Grand total	
	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage
Alberta:												
New-field wildcats	8	29,682	6	27,337	1	12,516	15	69,535	99	416,386	114	485,921
Outposts	10	31,317	5	10,947	0	0	15	42,264	10	45,760	25	88,024
New-pool wildcats	2	7,586	0	0	0	0	2	7,586	6	26,471	8	34,057
Deeper-pool tests	1	2,143	0	0	0	0	1	2,143	1	1,403	2	3,546
Shallower-pool tests	0	0	0	0	0	0	0	0	0	0	0	0
Saskatchewan:												
New-field wildcats	4	8,637	0	0	0	0	4	8,637	13	31,904	17	40,541
Outposts	1	1,894	0	0	0	0	1	1,894	3	5,794	4	7,688
New-pool wildcats	0	0	0	0	0	0	0	0	2	4,101	2	4,101
Deeper-pool tests	0	0	0	0	0	0	0	0	0	0	0	0
Shallower-pool tests	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	81,259	11	38,284	1	12,516	38	132,059	134	531,819	172	663,878

TABLE 3—EXPLORATORY DRILLING IN MEXICO IN 1948

State and well classification—	Producers						Dry		Grand total	
	Oil		Condensate		Total producers					
	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage
Chihuahua—New-field wildcats	0	0	0	0	0	0	1	8,515	1	8,515
Puebla—New-field wildcats	0	0	0	0	0	0	1	4,140	1	4,140
San Luis Potosi—New-pool wildcats	1	2,162	0	0	1	2,162	4	12,325	5	14,487
Tabasco—New-field wildcats	0	0	1	4,024	1	4,024	2	12,788	3	16,812
Tamaulipas—New-field wildcats	1	8,114	1	6,228	2	14,342	2	20,152	4	34,494
Veracruz—										
New-field wildcats	2	7,433	0	0	2	7,433	9	72,357	11	79,790
New-pool wildcats	2	6,205	0	0	2	6,205	1	2,044	3	8,249
Deeper-pool tests	0	0	0	0	0	0	1	2,858	1	2,858
Total	6	23,914	2	10,252	8	34,166	21	135,179	29	169,345

largely a result of regular field development, not of exploratory drilling. In fact, some study of this matter leads us to conclude that probably not more than 2 per cent—certainly not more than 5 per cent—of the new proved reserves added by extensions in any given year is attributable to exploratory drilling. It is nearly all to be credited to field-development drilling.

However, this "extension oil," each year, is really a followup of the discoveries of several preceding years. In this sense certain fractions of it might be credited to years gone by, but this would involve many serious difficulties. We believe that it is better to refer to the simpler picture as presented in Table 5, keeping in mind that columns G and I do not actually measure the results of the exploratory effort for any given year.

A question sometimes asked con-

TABLE 4—BASIS FOR LOCATING NEW-FIELD WILDCATS DRILLED IN 1948

State—	Geology		Geophysics*		Geology and geophysics*		Sundry nontechnical		Unknown		Total		Grand total
	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	
Alabama	0	8	0	7	0	2	0	1	0	1	0	19	19
Arizona	0	1	0	0	0	0	0	2	0	1	0	4	4
Arkansas	0	59	2	12	2	13	0	1	0	12	4	97	101
California	14	145	0	2	4	32	0	23	0	12	18	214	232
Colorado	2	31	0	0	2	4	0	1	0	1	4	37	41
Florida	0	10	0	5	0	0	0	6	0	0	0	21	21
Georgia	0	0	0	2	0	0	0	1	0	0	0	3	3
Illinois	24	156	2	1	2	12	0	32	0	3	28	204	232
Indiana	14	70	0	1	0	3	0	65	6	56	20	195	215
Kansas	5	86	4	20	3	10	0	10	2	53	14	179	193
Kentucky	10	69	0	0	0	0	0	10	1	26	11	105	116
Louisiana	3	59	25	90	7	44	0	0	0	0	35	193	228
Maryland	0	1	0	0	0	0	0	0	0	0	0	1	1
Michigan	14	215	0	0	0	0	0	0	0	26	14	241	255
Mississippi	0	16	3	52	0	23	0	3	0	3	3	97	100
Missouri	0	0	0	0	0	0	0	0	0	2	0	2	2
Montana	2	18	0	3	1	2	0	1	0	1	3	25	28
Nebraska	0	1	0	1	0	0	0	2	0	5	0	9	9
Nevada	0	0	0	0	0	0	0	1	0	0	0	1	1
New Jersey	0	0	0	0	0	0	0	0	0	1	0	1	1
New Mexico	3	31	0	3	5	14	0	6	0	22	8	76	84
New York	0	19	0	0	0	0	0	1	0	4	0	24	24
North Dakota	0	0	0	1	0	0	0	0	0	1	0	2	2
Ohio	3	8	0	0	0	0	1	7	8	8	12	23	35
Oklahoma	13	112	17	77	0	0	7	119	0	9	37	317	354
Pennsylvania	1	8	0	0	0	3	0	1	0	0	1	12	13
South Dakota	0	1	0	0	0	0	0	1	0	1	0	3	3
Tennessee	0	10	0	0	0	0	0	0	6	39	6	49	55
Texas	110	838	66	311	69	225	2	71	11	100	258	1,545	1,803
Utah	2	7	0	0	0	1	0	3	0	0	2	11	13
Virginia	1	1	0	0	0	0	0	0	0	0	1	1	2
Washington	0	2	0	3	0	2	0	0	0	0	0	7	7
West Virginia	8	11	0	0	0	0	0	1	0	2	8	14	22
Wyoming	3	46	5	4	4	10	2	3	0	0	14	63	77
Total	232	2,039	124	595	99	400	12	372	34	389	501	3,795	4,296

*Including a few holes located on geochemistry.

TABLE 5—SUMMARY OF STATISTICS ON PROVED RESERVES AND EXPLORATORY DRILLING IN THE UNITED STATES

Year	A Proved oil reserves as of Jan. 1 (1,000's of bbl.)	B Proved oil reserves as of Dec. 31 (1,000's of bbl.)	C Net new proved oil reserves (1,000's of bbl.) B/A	D Oil production during year (1,000's of bbl.)	E Gross new proved oil reserves (C+D) (1,000's of bbl.)	F Total exploratory footage (ft.)	G New proved oil reserves (E) per exploratory foot drilled (bbl.) E/F	H Total No. of exploratory holes drilled	I New proved oil reserves (E) per exploratory hole drilled (bbl.) E/H
1938	15,507,268	17,348,146	1,840,878	1,213,186	3,054,064	8,860,484	344.7	2,638	1,157,719
1939	17,348,146	18,483,012	1,134,866	1,264,256	2,399,122	8,793,097	272.8	2,702	887,906
1940	18,483,012	19,024,515	541,503	1,351,847	1,893,350	10,253,948	184.6	3,038	623,223
1941	19,024,515	19,589,296	564,781	1,404,182	1,968,963	11,615,085	169.5	3,264	603,236
1942	19,589,296	20,082,793	493,497	1,385,479	1,878,976	12,123,994	155.0	3,212	584,986
1943	20,083,793	20,064,152	—18,641	1,503,427	1,484,786	15,719,713	94.5	4,008	370,456
1944	20,064,152	20,453,231	389,079	1,678,421	2,067,500	20,225,887	102.2	4,796	431,088
1945	20,453,231	20,826,813	373,582	1,736,717	2,110,299	23,030,266	91.6	5,613	375,966
1946	20,826,813	*24,036,779	*3,209,966	*1,855,610	*5,065,576	22,167,561	228.5	5,753	880,510
Year	Proved liquid hydrocarbon reserves as of Jan. 1 (1,000's of bbl.)	Proved liquid hydrocarbon reserves as of Dec. 31 (1,000's of bbl.)	Net new proved liquid hydrocarbon reserves found during year (1,000's of bbl.)	Liquid hydrocarbon production during year (1,000's of bbl.)	Proved gross new liquid hydrocarbon reserves (C+D) (1,000's of bbl.)	Total exploratory footage drilled during year (ft.)	New proved liquid hydrocarbon reserves (E) per exploratory foot drilled (bbl.) E/F	Total No. of exploratory holes drilled during year	New proved liquid hydrocarbon reserves (E) per exploratory hole drilled (bbl.) E/H
1947	24,036,779	24,741,660	704,881	2,011,227	2,716,108	26,393,348	102.5	6,775	400,902
1948	24,741,660	26,821,227	2,079,567	2,186,197	4,265,764	32,741,097	130.3	8,013	532,855

*Under 1946, B, C, D, and E, and in all figures (A, B, C, D, E) in 1947 and 1948, both crude-oil proved reserves (A.P.I. Committee) and natural-gas liquids proved reserves (A.G.A. Committee) are included. Previous to 1946, not all natural-gas liquids proved reserves were included in these estimates. Consequently the figures in columns G and I for 1946 are not comparable with other figures in the columns either before or after 1946.

cerns the approximate percentage of true wildcatting (new-field wildcatting) by major companies, on the one hand, and by minor companies and independents, on the other hand. Distinction between these three classes of operator is not always easy, and in some instances the same company may be regarded as a "major" in one district, but as a "minor" in another district. Consequently we left the classification to the judgment of the various committeemen, each for his own district. Usually a major company is defined as one which is integrated with respect to at least three of the four main branches of production, transportation, refining, and marketing.

Our statistics showed that in the country as a whole, 948 new-field wildcats (182 producers and 766 dry holes) were drilled by majors; 2,941 new-field wildcats (280 producers and 2,661 dry holes) were drilled by minors and independents; and 407 new-field wildcats (39 producers and 368 dry holes) were drilled by minors or independents with the drilling financed by major companies.

In conclusion with reference to exploratory drilling in the United States, comparing 1948 figures with those of 1947, we note the following:

1. In number of exploratory holes drilled there was an increase of 18.2 per cent, and in exploratory footage drilled there was an increase of 24.1 per cent. The increases in 1948 over 1946, based on 1946 figures, were 39.3 per cent in holes drilled and 47.6 per cent in footage.

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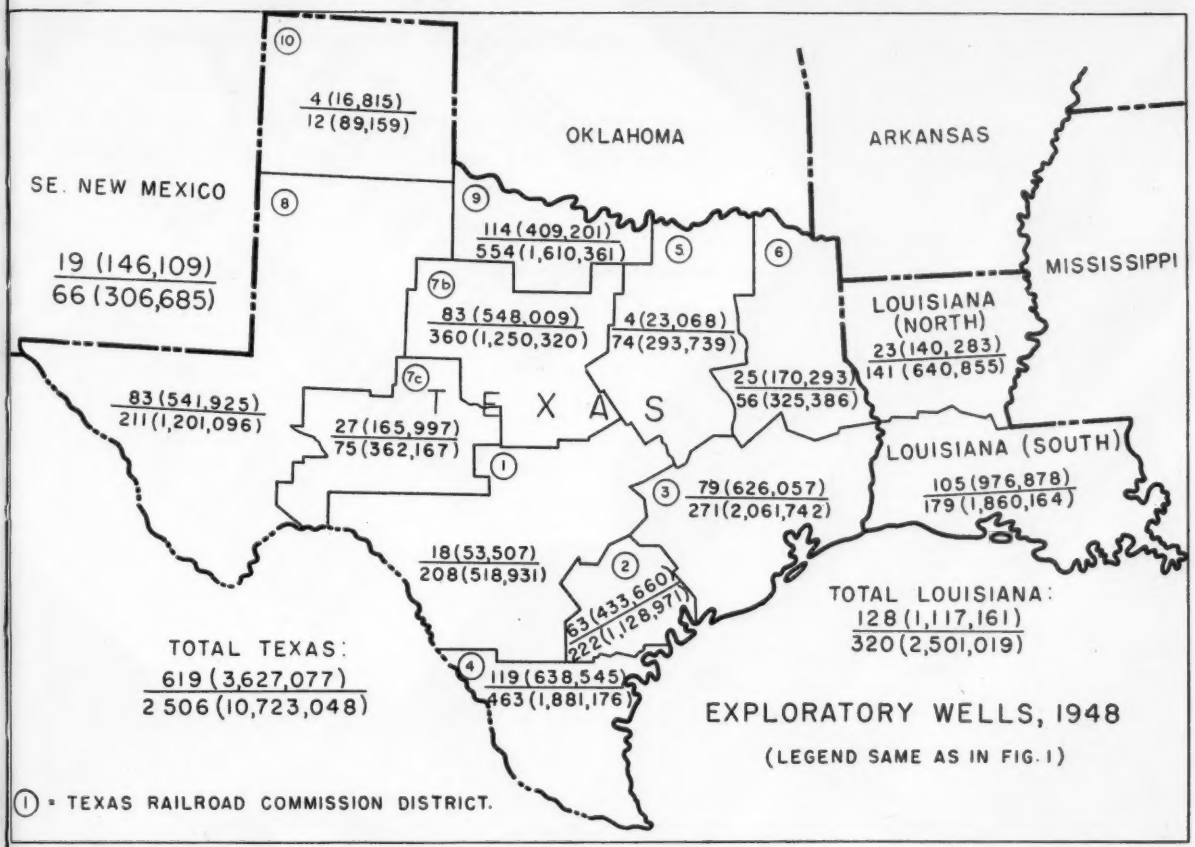


Fig. 2—Detailed data on exploratory drilling for southeastern New Mexico, Texas, and Louisiana

2. Considering only the new-field wildcats, 1948 witnessed an increase of 23.4 per cent in holes drilled and an increase of 28.2 per cent in footage drilled, compared with 1947. Compared with 1946, the corresponding 1948 increases were 37.4 and 49.6 per cent respectively.

3. In many of the states there were large increases in exploratory drilling in 1948, contrasted with 1947, but there was a decrease in Florida, Georgia, Ohio, Oklahoma, and Pennsylvania.

4. The average depth of hole for all exploratory drilling increased from 3,896 ft. in 1947 to 4,086 ft. in 1948.

Exploratory Drilling in Canada

Statistics on exploratory drilling in western Canada were compiled by F. K. Beach, assisted by John Gray, W. P. Hancock, and J. Porter.

In western Canada last year 172 exploratory holes were completed, all of these being within the two provinces, Saskatchewan and Alberta (see Table 2). These 172 holes included 38 producers (26 oil, 11 gas, and 1 condensate) and 134 dry holes.

A total of 663,878 ft. was drilled, 132,059 ft. in the producers and 531,819 ft. in the dry holes. This means that 22.1 per cent of the exploratory holes and 19.8 per cent of the exploratory footage were successful. Four feet were drilled in dry holes for every foot drilled in producers. The average depth was 3,859 ft.

Among the 131 new-field wildcats completed in 1948, 19 were successful and 112 were dry. In other words, new-field wildcatting was 14.5 per cent successful. One producer was drilled for every 5.89 dry holes.

In eastern Canada 71 exploratory holes were drilled. On seven of these, all dry, no footage is reported. The other 64 were divided, 3 gas wells, 2 oil wells, 59 dry; total footage for the 64 wells, 119,456 ft. Three of the 71 were deeper pool tests, all dry, the other 68 were all new field wildcats.

The geographic distribution was as follows: Southwestern Ontario, 2 oil, 3 gas, 3 dry deeper pool tests, 56 dry new field tests; Quebec (St. Lawrence Lowlands), 1 dry new-field test; Quebec (Gaspe), 3 dry new-field tests; New Brunswick, 3 dry new-field tests; total eastern Canada, 71 tests.

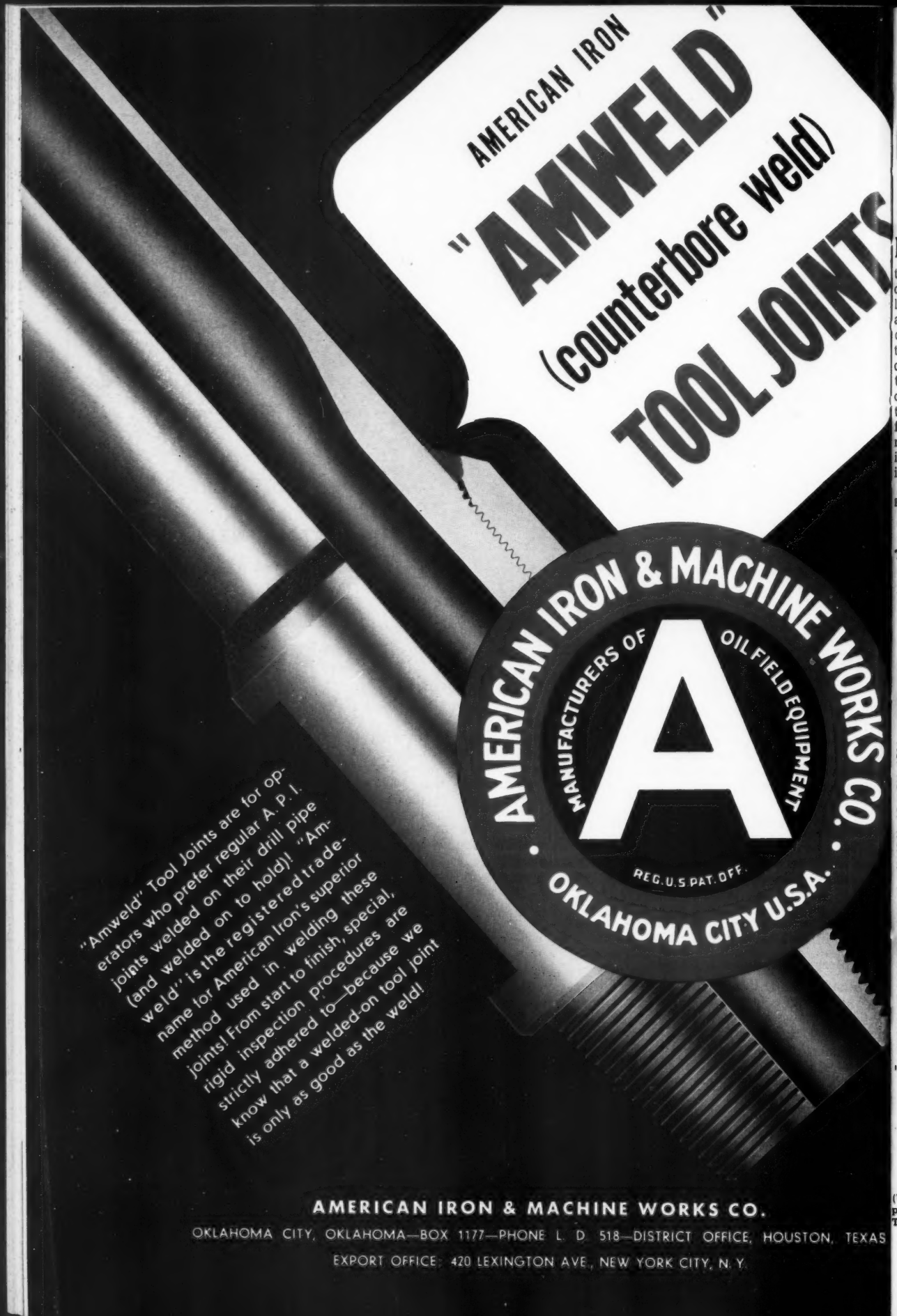
Exploratory Drilling in Mexico

All exploratory drilling in Mexico was accomplished through the governmental organization, Petroleos Mexicanos. Data on the 1948 exploratory program were kindly provided for this report by Ing. Manuel Rodriguez Aguilar. These data are listed in Table 3. A total of 29 exploratory holes were drilled, with a total of 169,345 ft. Of these holes, eight (six oil wells and two condensate producers) were successful, these eight holes having a total of 34,166 ft. According to these figures, this exploratory program was 27 per cent successful. For each producer foot, 3.9 ft. were drilled in dry holes. The average depth of all 29 holes was 5,839 ft.

Twenty of the 29 holes were new-field wildcats, and five of these, or 25 per cent, were successful. All were drilled on a technical basis as follows: two producers and six dry holes were located on geology; two producers and nine dry holes were located on geophysics; one producer was located on both geology and geophysics.

Conclusion

There is no need here to repeat any of the figures and comparisons already made in the foregoing text. We do wish to say, in closing, that we are highly gratified to note the interest of our Canadian and Mexican neighbors in this study of exploratory drilling for oil and gas. They have made an excellent start and we may feel sure that, with annual repetition of the compiling and publication of these data, valuable deductions will be possible.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6—Summarization Statement on:

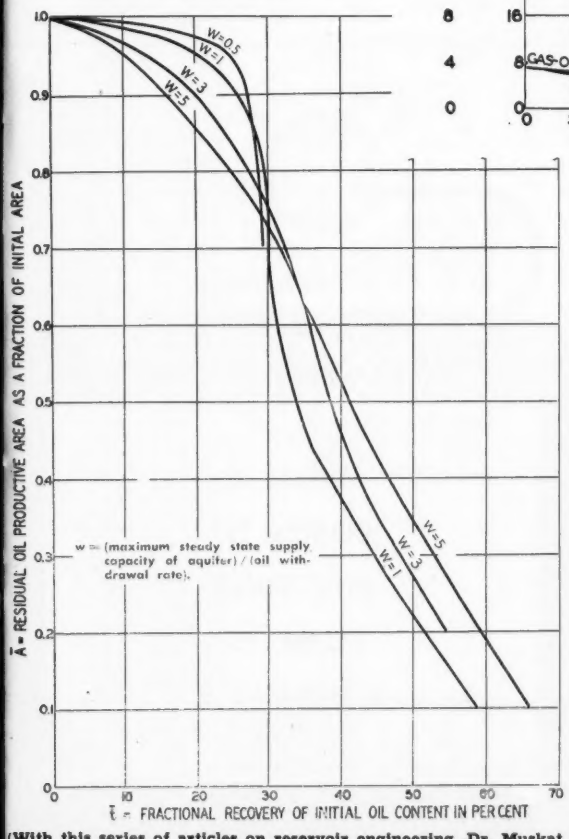
PARTIAL WATER DRIVES

*by Dr. Morris Muskat**

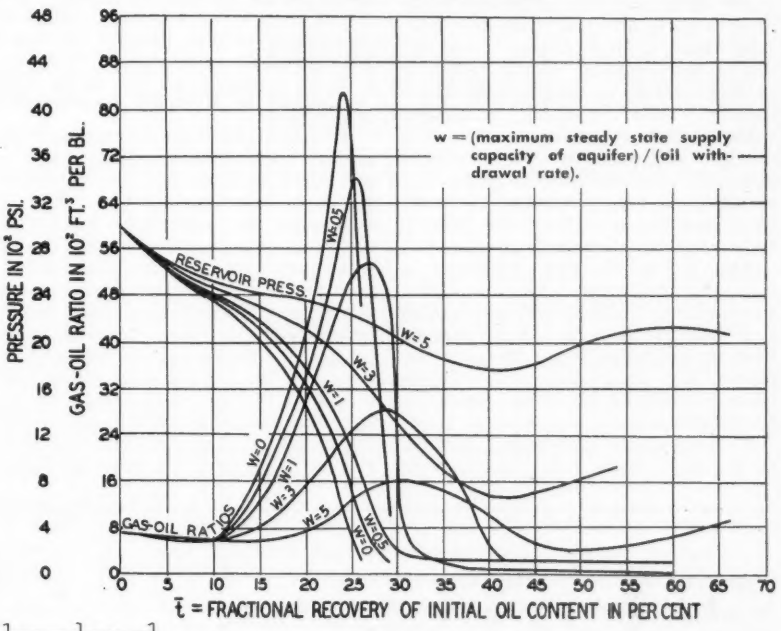
PARTIAL water-drive reservoirs are considered to be those where the magnitude of the water intrusion does not suffice to replace completely the reservoir voidage due to gas and oil withdrawals. Most oil-producing reservoirs probably fall in this classification, although, as in the case of other producing mechanisms, the role played by any one may change during the producing life and the controlling mechanism may shift from one type to another. From a reservoir-performance standpoint and in terms of individual well behavior it appears appropriate to treat partial water-drive systems as modified gas-drive reservoirs. In many respects it is similar to gravity drainage reservoirs, although the basic recovery mechanisms are quite different.

*Gulf Research & Development Co., Pittsburgh.

THEORETICAL HISTORIES OF RESIDUAL-OIL PRODUCTIVE AREA IN PARTIAL-WATER-DRIVE SYSTEMS


W=0.5
W=1
W=3
W=5
w = (maximum steady state supply capacity of aquifer) / (oil withdrawal rate).
Ā = RESIDUAL OIL PRODUCTIVE AREA AS A FRACTION OF INITAL AREA
t̄ = FRACTIONAL RECOVERY OF INITIAL OIL CONTENT IN PERCENT

THEORETICAL PRESSURE AND GAS-OIL-RATIO HISTORIES IN PARTIAL-WATER-DRIVE SYSTEMS


w = (maximum steady state supply capacity of aquifer) / (oil withdrawal rate).
RESERVOIR PRESS.
GAS-OIL RATIOS
W=0.5
W=1
W=3
W=5
W=0
PRESSURE IN 10³ PSI.
GAS-OIL RATIO IN 10³ FT.³ PER BL.
t̄ = FRACTIONAL RECOVERY OF INITIAL OIL CONTENT IN PER CENT

(With this series of articles on reservoir engineering, Dr. Muskat presents a number of important relationships in graphic form. These specific diagrams have not previously appeared in print.)

Because the strict gas-drive and complete water drive reservoirs are already rather difficult of exact treatment, no detailed analytical study has been reported of partial water-drive systems except from the gross material-balance standpoint. It is possible, however, to formulate analytically the behavior of partial water-drive reservoirs. Such may take the form either of a set of differential equations to be solved simultaneously or a set of algebraic equations of the material-balance type, although in either case it is necessary to introduce basic idealizing assumptions regarding reservoir uniformity and manner of operation.

Physically, partial water-drive reservoirs may be visualized as a gas-drive system with shrinking boundaries or decreasing productive area, the latter being determined by the nature of the water intrusion and its reaction to the reservoir pressure. The primary variables of the system are, therefore, the average reservoir pressure in the gas-drive productive area, the mean oil saturation in this area, and the magnitude of the area. These are interrelated and simultaneously vary with the time. If the water intrusion is assumed to be of the steady-state type, the magnitude can be expressed by an index representing the ratio of maximum supply capacity of the bounding aquifer to the rate of oil withdrawal. Small values of this ratio imply that the contribution of the water-drive component will be minor, whereas large values will correspond to systems in which the increasing contribution of the water drive as the reservoir pressure declines may ultimately develop as a controlling mechanism and lead to complete water-drive action.

Following these concepts and representations, performance histories of several partial water-drive systems have been calculated with different values of the water-intrusion index. These show the behavior to be expected qualitatively from the physical picture underlying the con-

struction of the equations. For low values of the water-intrusion index, the gas-oil-ratio and pressure histories are very similar to those for strict solution-gas drive except for a moderate retardation in reservoir-pressure decline, a reduction of the maximum value of the gas-oil ratio and an increase in the ultimate recovery. The productive area shrinks only slowly until the state of depletion is approached.

Change for High Index

At relatively high values of the water intrusion index the performance is quite different, although initially there is little change from the gas-drive behavior. The reservoir pressure tends to stabilize and ultimately, after reaching minimum values, begins to rise again. The gas-oil-ratio histories are also materially changed. In accordance with the changes in the pressure histories, their maximum values are greatly reduced, and they fall to minimal values before ultimate depletion is reached, and ultimately rise again. The latter is related to the assumption that the free gas phase will go back into solution when the pressure rises. The productive area continually shrinks as the water invasion progresses.

A particularly interesting feature of the calculation is the fact that in contrast to the strict solution-gas-drive performance, in which the oil saturation declines monotonically as production continues, the oil saturation in the productive area in the case of the partial water drives falls to a minimum and then rises again. This represents a resaturation due to the fact that the rate of displacement of oil into the residual-oil productive area exceeds the rate of withdrawals. In some cases virtually complete resaturation is indicated by the calculations, and when the oil saturation is built up to the equilibrium value the gas-oil ratio is reduced to that of solution in the oil phase and follows directly the current reservoir pressure.

Control of Ultimate Recovery

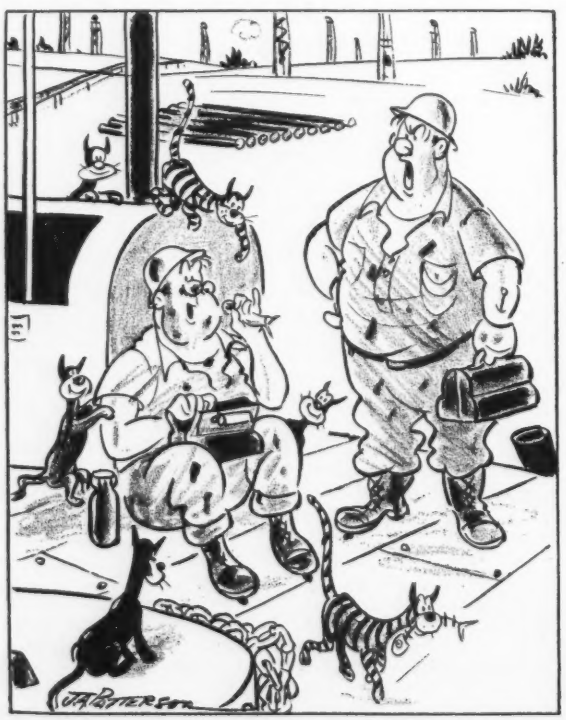
Although the basic performance of partial water-drive systems can be described in terms of the solution-gas-drive mechanism, the ultimate recoveries are essentially controlled by the displacement efficiency of the water invading the oil-productive area and the uniformity of the water intrusion. Thus, if production could be continued until the invading water completely floods out the oil-productive area the recovery would be determined by the residual-oil saturation behind the advancing water front and be substantially equivalent to that to be expected from complete water-drive reservoirs. In practice, however, such recoveries will be limited by the total pressure decline and the development of water cuts in the producing wells. Nevertheless, from a strictly theoretical standpoint, there is no basic difference in the ultimate recovery factors for partial and complete water drives except as the residual-oil saturations in the two cases will be different, due to the different local conditions under which the microscopic oil displacement takes place.

While no quantitative field data have been reported for checking the details of theoretical calculations, the theoretically predicted resaturation effect has been observed in water-injection operations.

Water Flooding Success In Beauregard Parish

The water-injection program in Beauregard Parish, Louisiana, has been in operation for 4 months and has proved unusually successful, it is reported by S. L. Digby, state conservation commissioner.

The practice has halted a drop in the pressure of Longville field. A return of approximately 1,800 bbl. of oil daily is obtained from the injection of about 5,000 bbl. of water per day.



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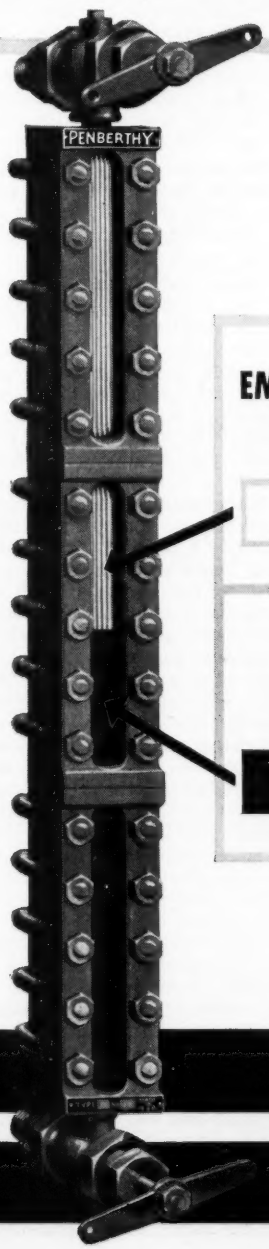

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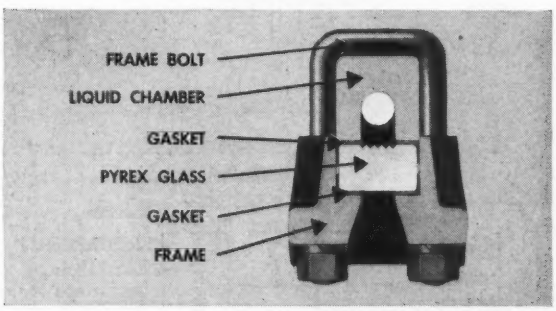

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Various Refinery Applications of Houdriflow Catalytic Cracking

by G. F. Hornaday, H. D. Noll,* C. C. Peavy,* and W. Weinrich**

THE petroleum industry is now confronted with a difficult problem in regard to the production of distillate and residual fuel. The supply of these fuels has exceeded demand. The price of residual fuel has dropped drastically within the past few months and distillate-fuel prices are decreasing also. In addition, the stocks of these fuels in storage have risen sharply and crude runs to the stills have been reduced in some refineries for the first time since the early part of 1946.

The best available tool for bringing the production of fuel oil into balance is catalytic cracking. Another factor contributing to an increase in cracking operations is the increase in octane rating. It is not unreasonable to expect material increases in octane numbers in the near future since engine designers are experimenting with higher-compression engines than those currently in production.

The sharp drop in the price of fuel oils makes it expedient at this time to reexamine the economics of refinery cracking operations. The major difference in the various operating schemes centers in the methods of preparing the feed stock for catalytic cracking.

For the purpose of this study four typical methods of refinery operation have been selected. These include thermal cracking alone, and combinations of catalytic cracking with vacuum distillation, visbreaking, and delayed coking of the reduced crude.

The processing schemes covered are listed below and simplified flow diagrams for these schemes are given in Figs. 1 and 2:

1. **Thermal.**—This processing scheme consists of conventional two-coil thermally cracking the 40 per cent volume East Texas residuum to an ultimate yield of motor gasoline.

2. **Vacuum distillation.**—The 40 per cent volume East Texas residuum is vacuum distilled to produce an 8.0 per cent volume asphalt. The vacuum gas oil plus the excess light virgin gas oil is catalytically cracked and the catalytic cycle stock remaining after blending the tar bottoms to No. 6 fuel-oil specification is thermally cracked.

3. **Visbreaking.**—The 40 per cent volume East Texas residuum is charged to a flash tower, and the resulting bottoms is visbroken and returned to the common flash tower. The flash-tower overhead stock plus excess virgin gas oil are catalytically cracked and the catalytic cycle stock remaining after blending the tar bottoms to No. 6 fuel oil specification is thermally cracked.

4. **Coking.**—The 40 per cent volume East Texas residuum is flash distilled to obtain an overhead fraction and the resulting bottoms is coked. The combined flash-tower overhead and total coker distillate plus excess light virgin gas oil are catalytically cracked and the catalytic cycle stock is thermally cracked.

In order to further this study, two additional processing schemes were calculated to show the effect of recycle catalytic cracking instead of thermally cracking the cycle stock. The two additional situations are alternates for the visbreaking and coking processing schemes and are designated 3A and 4A.

The basic yield data on which this survey is based were obtained during an extensive pilot-plant program by the Houdry laboratories to determine the effect of method of stock

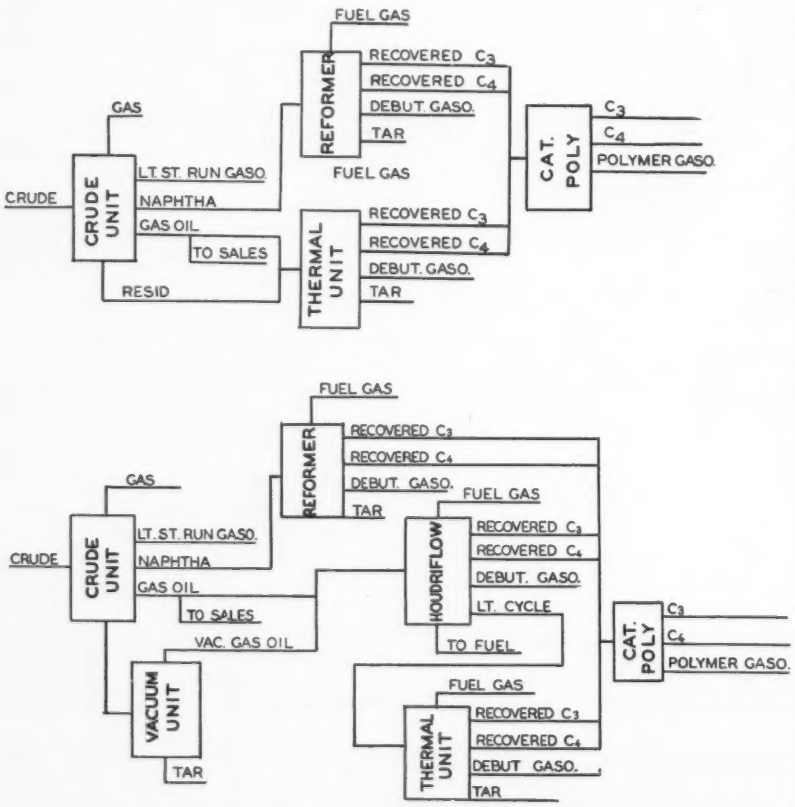


Fig. 1—Simplified flow diagram for thermal and vacuum flashing schemes

*Houdry Process Corp., Philadelphia. This paper was presented at the annual meeting of Western Petroleum Refiners Association, San Antonio, March 28-30.

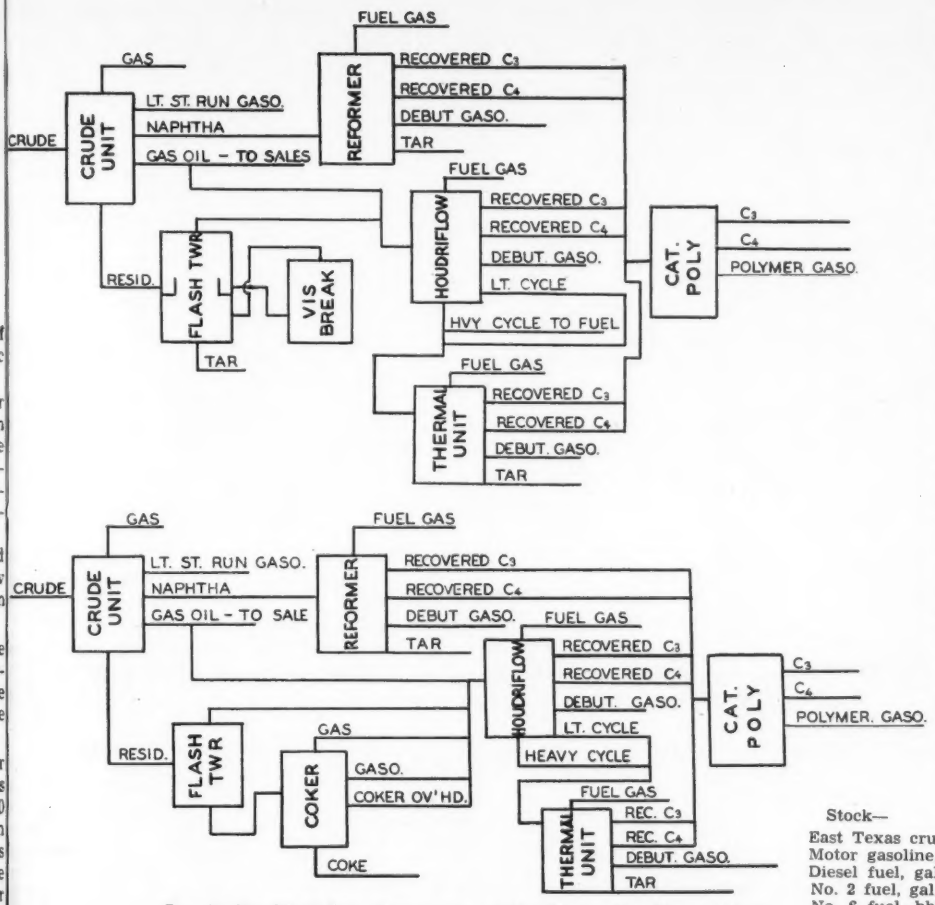


Fig. 2—Simplified flow diagram for visbreaking and coking schemes

preparation on the catalytic cracking characteristics of the resulting stocks. During this laboratory program stocks were prepared from East Texas reduced crude by coking, vacuum distillation, and by visbreaking to various severity levels. These stocks were cracked in a pilot catalytic cracking unit. Gasoline and fuel blends were prepared and tested.

In the economic study the crude charge is assumed to be 10,000 bbl. per calendar day of East Texas crude. The crude is distilled to obtain a 250° F. e.p. straightrun gasoline, a 250°-400° F. straightrun naphtha, a light gas oil for diesel or No. 2 fuel, and a 40 per cent volume residuum. The 250° F. e.p. straightrun gasoline is used directly in the final motor-gasoline blend. The 250°-400° F. naphtha is thermally reformed to obtain a 70-octane distillate. It was assumed that 1,000 bbl. per calendar day of light gas oil goes to sales and the remaining 960 bbl. per calendar day is available as catalytic cracking charge stock. The C_3 and C_4 fractions from the thermal and catalytic operations are charged to a catalytic polymerization unit to produce a polymer for use in the motor-gasoline blend.

In the economic comparisons the following typical Gulf Coast price structure and utility values were assumed to be representative of the prices existing at this time. It is recommended that individual refiners substitute their own price structure in order to determine their particular economics.

The over-all maintenance cost for the processing equipment was assumed at 4.0 per cent of investment. Taxes, interest, and insur-

Stock—	Price
East Texas crude, bbl.	$2.95
Motor gasoline, gal.	0.115
Diesel fuel, gal.	0.085
No. 2 fuel, gal.	0.085
No. 6 fuel, bbl.	1.50
Butanes, gal. (fuel value)	0.025
Fuel gas, M.M. B.t.u.	0.25
Steam, M lb.	0.35
Power, kwh.	0.008
Water (cooling), M. gal.	0.005
Water (treated), M. gal.	0.15
Clay catalyst, lb.	0.05

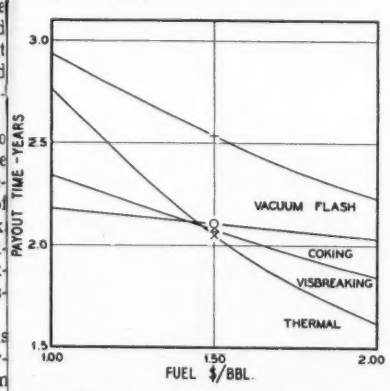


Fig. 3—Effect of fuel price on payout time. Gasoline 11.5 cents per gallon

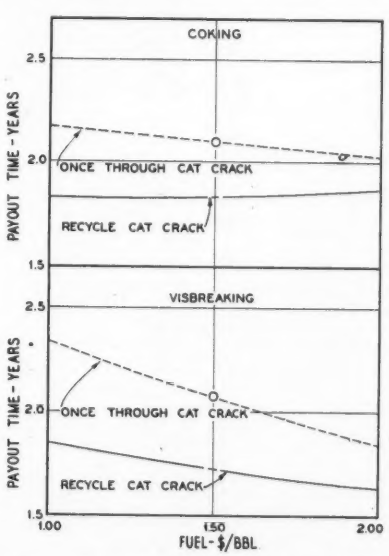


Fig. 4—Comparison once-through and recycle catalytic cracking on payout time

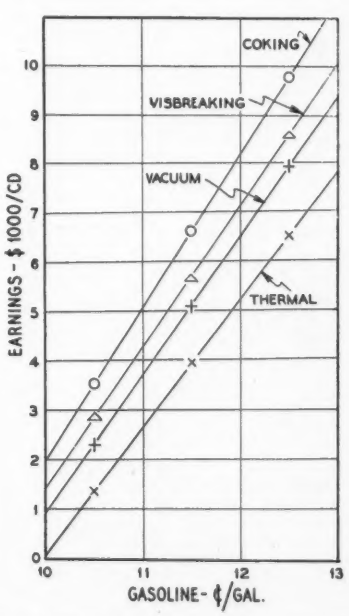


Fig. 5—Effect of gasoline price on earnings. Basis: fuel $1.50 per barrel

ance costs were estimated at 5.0 per cent of the investment. The royalty rates were assumed to be 5 cents per barrel of fresh feed for catalytic cracking, 3 cents per barrel of fresh feed for thermal cracking and reforming, and 0.5 cents per gallon of polymer for the catalytic polymerization.

It should be pointed out that the investments are for the primary processing equipment. No storage or offsite auxiliary facilities have been included. Consequently, net earnings are purely comparative.

The features of the main types of processing equipment are as follows:

1. **Thermal cracking.** — A conventional two-coil thermal cracking unit was assumed to handle the East Texas residuum with provision for visbreaking the residuum and cracking the light oil.

2. **Vacuum flashing.**—The reduced crude is flashed in a conventional vacuum tower and the vacuum gas oil is charged to the catalytic unit.

3. **Visbreaking.**—In order to minimize the investment by eliminating a flash tower, an integral-type flow is used. The reduced crude is charged to a flash tower and the resulting bottoms is charged to a visbreaker heater and then to the common flash tower. The combined vapor from the flash tower is charged to the catalytic unit.

4. **Coking.**—A drum-type delayed coking unit is used and the charge is the 15 per cent volume residuum from flashing the 40 per cent East Texas residuum in an atmospheric flash tower. The coker overhead products combine with the flash tower overhead for processing in the catalytic equipment.

TABLE 2—THERMAL REFORMING YIELDS

Scheme number	1-6
Charge to unit, B.p.c.d.:	
250°-400° F. naphtha	1,960
Yields based on charge, per cent vol.:	
Debut. gaso.	73.5
Fuel oil	3.0
Isobutane	1.5
Normal butane	2.3
Butenes	5.4
Propylene	5.1
Dry gas (C_2 + lighter), per cent wt.	15.3
Octane ratings (F-2):	
Charge	46.0
Product	70.0

TABLE 3—HOUDRIFLOW CATALYTIC CRACKING YIELDS

Scheme numbers—	2	3	4	3A	4A
Charge to unit, B.p.c.d.:					
Diesel fuel	960	960	960	960	960
Flash tower overhead:					
Virgin	....	2,504	2,504	2,504	2,504
Visbreaker	....	808	....	808	....
Coker overhead	....	....	1,303	....	1,303
Vacuum gas oil	3,179	....	....	....	....
Recycle	....	....	....	4,272	4,767
Total	4,157	4,272	4,767	8,544	9,534
Yields based on fresh charge, % vol.:					
Debut. motor gasoline	42.0	41.8	43.2	59.0	59.4
Catalytic gas oil	45.8	44.2	43.7	18.2	18.3
Isobutane	5.0	5.1	5.1	7.4	7.1
Normal butane	1.8	1.9	2.0	2.7	2.7
Butenes	4.3	4.3	4.8	5.5	5.6
Propylene	2.6	2.9	3.2	4.3	4.4
Dry gas (C_2 + lighter), per cent wt.	5.9	6.8	6.2	10.7	10.5
Carbon, per cent weight	4.6	5.0	5.5	8.4	9.5
Carbon, lb./hr. (stream day)	2,710	3,020	3,717	5,140	6,488

TABLE 1—SUMMARY OF ECONOMICS—PROCESSING—10,000 BBL. PER CALENDAR DAY EAST TEXAS CRUDE

Scheme number—		1		2		3		4		3A		4A	
Processing—		Thermal		Vac. dist. once through cat. crack.		Visbreaking once through cat. crack.		Coking once through cat. crack.		Visbreaking recycle cat. crack.		Coking recycle cat. crack.	
Revenue—	$/bbl.	B.p.c.d.	$/Day	B.p.c.d.	$/Day	B.p.c.d.	$/Day	B.p.c.d.	$/Day	B.p.c.d.	$/Day	B.p.c.d.	$/Day
10 lb. R.v.p. motor gasoline	$4.830	6,126	29,589	6,694	32,332	6,797	32,830	7,370	35,597	6,745	32,578	7,120	34,390
Diesel fuel	3.570	1,000	3,570	1,000	3,570	1,000	3,570	1,000	3,570	1,000	3,570	1,000	3,570
No. 2 fuel	3.570	....	....	....	....	....	....	....	....	505	1,803	629	2,246
No. 6 fuel	1.50	2,378	3,567	1,781	2,672	1,623	2,435	826	1,239	1,024	1,536	243	365
Dry gas (F.O.E.)	1.50	739	1,109	744	1,116	794	1,191	858	1,287	753	1,130	794	1,191
Excess butane (as fuel)	1.05	....	....	43	45	65	68	80	84	124	130	130	136
Coke	*5.00	....	....	....	....	....	....	....	220	....	....	....	220
Total revenue			37,835		39,735		40,094		41,997		40,747		42,118
Operating costs—													
Crude	2.95	10,000	29,500	10,000	29,500	10,000	29,500	10,000	29,500	10,000	29,500	10,000	29,500
Crude distillation	....	10,000	772	10,000	772	10,000	772	10,000	772	10,000	772	10,000	772
Houdriflow cracking	....	....	....	4,157	703	4,272	812	4,767	815	8,544	1,063	9,534	1,093
Gas plant	....	....	238	....	592	....	605	....	654	....	629	....	679
Thermal cracking	....	4,960	1,089	1,552	489	1,614	500	2,063	585	....	....	....	....
Thermal reforming	....	1,990	453	1,990	453	1,990	453	1,990	453	1,990	453	1,990	453
Vacuum distillation	....	....	....	4,000	355	....	....	....	....	....	....	....	....
Coking	....	....	....	....	....	....	....	1,497	427	....	....	1,497	427
Catalytic polymerization	....	261	226	358	256	373	261	422	276	373	261	407	272
TEL to 80 O.N. (F-2) (1,000 cc.)	†0.22	437	962	210	464	228	502	337	742	147	324	203	447
Gasoline inhibitor	....	6,241	6	6,694	7	6,797	7	7,370	7	6,745	7	7,120	7
Taxes, int. ins.	....	....	401	....	647	....	589	....	695	....	586	....	678
Houdriflow royalty	‡5.0	....	....	4,157	208	4,272	214	4,767	238	4,272	214	4,767	238
Thermal royalty	‡3.0	6,950	209	3,542	106	3,604	108	4,073	122	1,990	60	1,990	60
Cat. poly. royalty	‡21.0	261	55	358	75	373	78	422	89	373	78	407	85
Total operating costs	....	....	$33,911	....	$34,627	....	$34,401	....	$35,375	....	$33,947	....	$34,711
Earnings, $/C.d.	....	....	3,924	....	5,108	....	5,693	....	6,622	....	6,800	....	7,407
Payout time, years	....	....	2.04	....	2.53	....	2.07	....	2.10	....	1.72	....	1.83
TEL to 78 O.N. (F-2) (1,000 cc.)	....	283	$623	104	$229	114	$251	186	$409	65	$143	96	$211
Earnings, $/C.d.	....	....	4,263	....	5,343	....	5,944	....	6,955	....	6,981	....	7,643
Payout time, years	....	....	1.89	....	2.42	....	1.98	....	2.00	....	1.68	....	1.77
TEL to 82 O.N. (F-2) (1,000 cc.)	....	669	$1,472	388	$854	399	$878	557	$1,226	306	$673	389	$856
Earnings, $/C.d.	....	....	3,414	....	4,718	....	5,317	....	6,138	....	6,451	....	6,998
Payout time, years	....	....	2.35	....	2.74	....	2.22	....	2.27	....	1.82	....	1.94
Investments (proc. equip. only)—													
Crude distillation	....		$700,000		$700,000		$700,000		$700,000		$700,000		$700,000
Houdriflow cat. and feed prep.	....		....		1,505,000		1,550,000		1,600,000		1,900,000		1,960,000
Vacuum unit	....		....		500,000		....		....		....		....
Gas plant	....		680,000		775,000		800,000		840,000		825,000		850,000
Thermal cracking and reforming	....		1,180,000		800,000		800,000		880,000		400,000		400,000
Catalytic poly. and feed treating	....		370,000		440,000		450,000		485,000		450,000		470,000
Coker	....		....		....		....		570,000		....		570,000
Total	....		$2,930,000		$4,720,000		$4,300,000		$5,075,000		$4,275,000		$4,950,000

*Per ton. †Cents per cc. ‡Cents per barrel.

5. **Houdriflow.** — In all of these studies the new Houdriflow catalytic cracking process is used.

This catalytic cracking process* retains the desirable features of the conventional T.C.C. process and in addition a number of improvements have been made which result in greater flexibility and lower cost. These improvements include a new method for moving catalyst, the use of higher catalyst-to-oil ratios, a simplified kiln, and a more compact physical arrangement of the vessels.

A summary of the relative advantages of the various processing schemes when producing a gasoline having an 80 F-2 octane rating is as follows:

Scheme No.	Processing—	Investment	Payout period, years	Earnings, $/CD	No. 6 fuel produced, per cent on crude	cc. TEL to 80 O.N. motor
1.	Thermal	$2,930,000	2.04	3,924	23.78	1.7
2.	Vacuum distillation	4,720,000	2.53	5,108	17.81	0.75
3.	Visbreaking	4,300,000	2.07	5,693	16.23	0.80
4.	Coking	5,075,000	2.10	6,622	8.26	1.09
3A.	Visbreaking—recycle cat. cracking	4,275,000	1.72	6,800	10.24	0.52
4A.	Coking—recycle cat. cracking	4,950,000	1.83	7,407	2.43	0.68

The summary indicates that at the present gasoline prices and provided the refiner has a market for coke, the delayed-coking process is a very attractive method for preparing catalytic cracking feed stocks. Although the coking scheme results in the largest investment, the payout time comprises very favorably with the other processes, and the earnings per day are appreciably higher than for the other processes.

*See article on "Houdriflow Catalytic Cracking," The Oil and Gas Journal, January 13, 1949, p. 78.

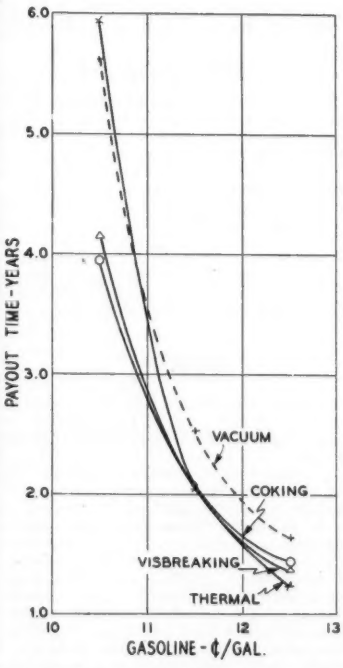


Fig. 6—Effect of gasoline price on payout time. Fuel $1.50 per barrel

Visbreaking compares favorably with the coking process in that it has a lower investment, slightly lower payout time, but produces lower earnings. Recycle catalytic cracking of the cycle stocks (schemes 3A and 4A) indicates reduced payout times and higher earnings over once-through catalytic cracking followed by thermal cracking of the net cycle stocks after fuel blending. Complete investment, operating costs, and earnings are summarized in Table 1. Basic yield data for the various operations are shown in Tables 2, 3, and 4.

The effect of the price of residual fuel on the payout time with once-through catalytic cracking and with recycle cracking is shown in Figs. 3 and 4. Variation in the fuel price produces the greatest effect on the earnings of the processing schemes producing the most residual fuel. The coking scheme is the least affected by the price of fuel. Recycle catalytic cracking minimizes residual fuel when compared to once-through catalytic cracking followed by thermal cracking of the catalytic cycle stock. The recycle operation is affected less by the price of fuel and shows considerable advantage over once-through cracking.

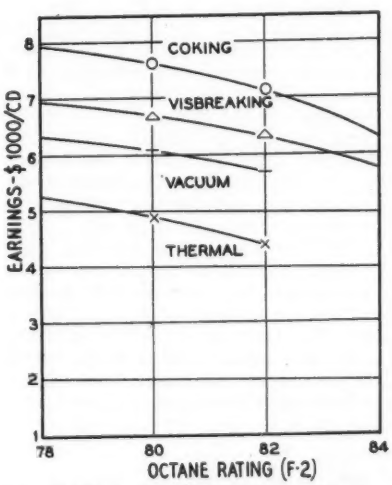


Fig. 7—Effect of octane rating on earnings. Basis: fuel $1.50 per barrel, gasoline 11.5 cents per gallon

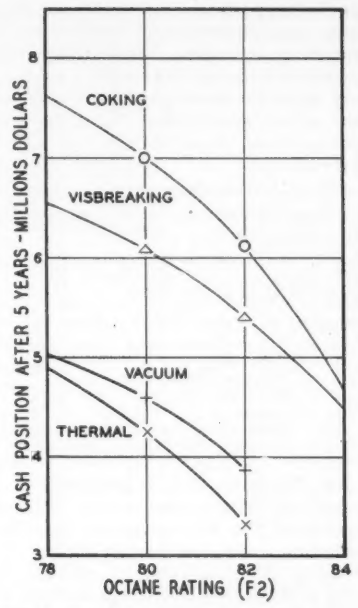


Fig. 8—Effect of octane requirement on cash position after 5 years. Basis: fuel $1.50 per barrel, gasoline 11.5 cents per gallon

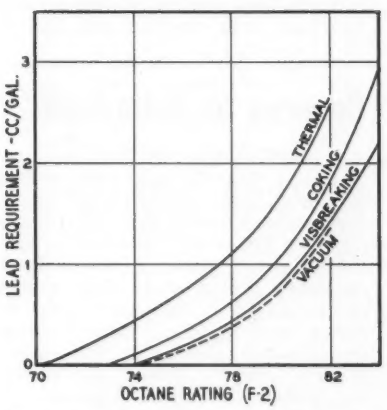


Fig. 9—Lead requirement vs. octane rating

As the gasoline price increases, with fuel price remaining constant, the ad-

TABLE 4—THERMAL CRACKING YIELDS

Scheme numbers—	1	2	3	4
Charge stock, B.p.c.d.:				
Diesel	960	....	....	....
Reduced crude	4,000	....	....	....
Catalytic gas oil	....	1,552	1,614	2,083
Total	4,960	1,552	1,614	2,083
Gravity, °A.P.I.	24.8	28.5	26.9	27.6
Yields—per cent volume:				
Debut. motor gasoline	43.4	47.5	47.7	47.1
Isobutane	1.8	1.4	1.4	1.4
Normal butane	1.4	3.2	3.4	3.3
Butenes	2.6	3.6	3.6	3.6
Propylene	2.1	3.0	3.0	3.0
Fuel oil	46.7	36.5	37.1	36.8
Dry gas (C_2 + lighter), per cent weight	8.3	12.5	12.5	12.5

vantage of the coking, vacuum flashing, and visbreaking over thermal cracking increases. The differential earnings between the various processing schemes are only slightly affected by substantial changes in gasoline price. This is illustrated in Figs. 5 and 6.

The lead requirements for the motor-gasoline blends vary appreciably depending on the method of processing. A brief summary of the lead requirement is as follows:

Scheme No.	Processing—	Lead requirement, cc./gal. 78 O.N.	80 O.N.	82 O.N.	84 O.N.
1.	Thermal	1.1	1.7	2.6	
2.	Vacuum distillation	0.37	0.75	1.38	2.15
3.	Visbreaking	0.4	0.8	1.40	2.2
4.	Coking	0.6	1.09	1.8	2.95
3A.	Visbreaking—recycle cat. cracking	0 23	0.52	1.08	1.7
4A.	Coking—recycle cat. cracking	0.32	0.68	1.30	2.0

On the basis of this summary it is apparent that as the octane level is increased the advantage of catalytic cracking over thermal cracking increases. The advantage of coking over visbreaking decreases because of the higher lead requirement. The higher lead requirement is the result of the lower octane of the coker gasoline.

If the lead content of the gasoline had been held constant and the octane difference corrected by the amount or severity of naphtha reforming, the relative advantage of catalytic cracking over thermal cracking would be enhanced.

The influence of the octane rating requirement of the motor gasoline on the economics is shown in Figs. 7 and 8. The lead requirements for the various gasolines are presented in Fig. 9.

The studies as presented in this paper indicate the following conclusions:

1. At the present market conditions, coking or visbreaking are the best methods for preparing catalytic cracking charging stocks.

2. More catalytic cracking capacity appears necessary because of the octane advantage of catalytic over thermal gasolines.

3. To minimize the production of residual fuel, the use of catalytic cracking is advantageous.

Caverns at Dollarhide

(Continued from page 68)

After letting the first-stage cement set for 6 hours, second-stage operations were started. These consisted of pumping 238 sacks of cement through the cementer ports, followed by a cementer closing plug. This volume of cement filled the hole behind the casing from 8,292 to 7,000 ft. After checking to make certain the cementer was properly closed, the cement was allowed to set for 8 hours.

Use of large amounts of cement in this second stage have resulted in placing too much weight on the Wichita formation, causing it to break down. Thus four stages were used at 16-E Cowden to bring the cement column up to the 9⅝-in. casing at about 3,000 ft.

Before starting both the third and fourth stages, temperature surveys were run to locate the top of the cement column behind the 7-in. casing. The casing then was perforated with four holes just above these levels and circulation with clear water established. In the third stage 234 sacks of cement were used and in the fourth stage, 1,258 sacks.

After permitting the last stage to set for 36 hours, the cement plugs were successively drilled out and the perforations tested with a surface pressure of 2,000 psi. The two-stage cementer was next drilled out and 1,500-psi. pressure applied to test the lower or first-stage job. Remainder of the cement in the casing was then drilled out, the drill pipe run to bottom, and all cement cuttings circulated from the casing.

Next step was to drill out the bull-plug guide shoe, the result being that circulation again was lost. Therefore, a cement retainer was set about 20 ft. above bottom, on the drill pipe, and enough cement pumped in to fill the hole behind the casing up into the cavern. After permitting the cement to set for 36 hours, the retainer was drilled out and the job tested with surface pressure of 1,000 psi.

At the Pure 16-E Cowden, open 6⅛-in. hole will be drilled into the Ellenburger (the well is still drilling) where 5½-in. flush-joint liner will be set. The liner, some 1,500 ft. in length, will then be cemented from bottom to top, gun perforated opposite the Ellenburger pay, and the well completed in the conventional manner.

West Red River Field

(Continued from page 77)

wells, and active and abandoned gas-injection wells.

Conclusion

Major changes in the present operation of West Red River field, which are suggested by the authors' studies, involve (1) unitization of the lease ownerships, (2) raising the fluid levels in the producing wells to obtain more efficient control of the repressuring medium, (3) selectively plugging off relatively high permeable strata, and (4) switching gas-input wells to obtain better distribution and spread of the repressuring medium. The study indicates also that a thorough investigation is warranted of the possibilities of increasing the rate and ultimate recovery of oil by water flooding.

TABLE 1—SALIENT DATA ON WEST RED RIVER FIELD, TILLMAN COUNTY, OKLAHOMA

(Portion of field operated under government supervision)

Proved area, acres	327
Maximum number of producing oil wells	81
Well spacing, acres per well	4
Estimated thickness of oil-producing formation, ft.	34.7
Volume of oil-producing formation, acre-ft.	11,357
Estimated volume of stock-tank oil in reservoir originally,* bbl.	16,479,000
Estimated ultimate oil recovery,† bbl.	7,500,000
Estimated ultimate oil recovery per acre, bbl.	22,936
Estimated ultimate oil recovery per acre-ft., bbl.	660
Estimated ultimate oil recovery per oil well, bbl.	92,593
Estimated ultimate oil recovery by primary and secondary methods, per cent	45
Oil recovered to January 1, 1947, bbl.	6,900,440
Oil recovered per acre-ft. to January 1, 1947, bbl.	608

*Based upon an estimated original reservoir content of 1,451 bbl. of oil per acre-ft., calculated as follows: Volumetric shrinkage of oil during production, 12 per cent; volume of pore space occupied by connate water, 18 per cent; and porosity of reservoir rocks, 26 per cent. Thus the quantity of oil in the pore space of the reservoir equals:

$$\frac{43{,}560 \times 0.26 \times 0.82}{1.14 \times 5.614} = 1{,}451 \text{ bbl. stock-tank oil per acre-foot}$$

$1{,}451 \times 11{,}357 = 16{,}479{,}007$ bbl. stock-tank oil in reservoir originally.

†The estimate includes 1,436,300 bbl. of oil recovered by the injection of gas into the reservoir sands. This amount of "secondary oil" is 19 per cent of the estimated ultimate oil recovery.

Acknowledgment

The petroleum engineering study of West Red River field was conducted jointly by engineers of the federal Bureau of Mines and the federal Geological Survey. The writers gratefully acknowledge the cooperation and assistance given by engineers in both organizations, especially J. R. Reeve, J. A. Anderson, H. C. Fowler, D. B. Taliaferro, and R. K. Guthrie. Grateful acknowledgment is made of the cooperation of all the operating companies in the field and of the help and assistance provided by their engineers and production men.

BOOKS

SHORT HISTORY OF THE ART OF DISTILLATION. By R. J. Forbes. Published by E. J. Brill, Leiden, Holland. 405 pp.

A comprehensive account which traces the art of distillation from its earliest beginnings up to the birth of the modern still. It is profusely illustrated with 203 line drawings and photographs, and contains a chart of the most important protagonists in the history of distillation. Treating of man's attempts to obtain pure chemicals by the easiest method, the book examines those efforts among primitive peoples, the first great civilizations, the men of the Middle Ages, and includes the important contributions of such men as Brunschwygk, Boyle, and Lavoisier.

— A new catalytic reforming process for improving straight-run and natural gasoline

by Edwin F. Nelson

This article is from the paper, "Trends in Petroleum Refining," presented by the author at the annual meeting of the Western Petroleum Refiners Association, San Antonio, March 28-30. The author is vice president of Universal Oil Products Co., Chicago. A second phase of the author's discussion on refining trends will appear in next week's issue.

A NEW process for improving straightrun or natural gasoline is now announced by Universal Oil Products Co. A part of the success of the process is due to the use of platinum, and our research and development departments have become so used to referring to the process as "platforming" that we have decided that at this time we would officially christen it. Therefore our new catalytic reforming process is platforming.

The development of platforming has been a cooperative effort of many departments and individuals. Dr. Vladimir Haensel conceived the original idea and directed the research group carrying out this work. We are now ready to offer this process to refiners, and here present a few of its interesting features.

Platforming is a catalytic process for improvement of straightrun or natural gasolines which combines the desirable features of:

1. Large octane-number gain.
2. Low volumetric loss.
3. Moderate plant and operating costs.

The great yield-octane advantage of platforming is demonstrated by Table 1, showing comparative results on a typical Mid-Continent naphtha.

The ideal reaction in hydroforming is dehydrogenation of a naphthene to an aromatic. This reaction is beneficial to the octane number, but involves a severe volumetric loss, due to the high density of aromatics. In most straightrun stocks, however, 60-80 per cent of the material cannot undergo this ideal reaction but is subject to less desirable side reactions. The situation is reminiscent of thermal reforming, where only the higher boiling paraffinic part of the charge is capable of the preferred reaction. In both cases the predominant part of the charge has no possibility of a beneficial reaction.

Considerations of this character played an important role in the development of platforming, which

(Continued on page 100)

TABLE 1—COMPARISON OF YIELDS IN REFORMING a 200°-400° F. MID-CONTINENT NAPHTHA, 12.0 K.,* 35 MOTOR CLEAR OCTANE NUMBER; VARIOUS METHODS VS. "PLATFORMING"

	Thermal reforming	Thermal reforming + polymerization	Polyforming	Hydroforming	Platforming
Yield, volume per cent, 10 lb. R.v.p. or less	66	80	80	84	95
Outside butane required for 10 lb. R.v.p., volume per cent	0	2	0	6	4
Yield, volume per cent including outside butane	66	82	80	90	99
Octane ratings:					
Motor method (F-2):					
Clear	75	75	75	75	75
With 3 cc. TEL	84	84	85	86	87
Research method (F-1):					
Clear	85	85	86	81	80
With 3 cc. TEL	93	93	..	93	93

*Characterization factor.

TABLE 2—TYPICAL RESULTS IN PLATFORMING VARIOUS CHARGE STOCKS

Type of charging stock:	Straightrun naphtha and gasoline					Nat. gasoline,
Source of charging stock:	Michigan	Pennsylvania	Mid-Continent	Mid-Continent	Gulf Coast	Cotton Valley
Properties of charging stock:						
Gravity, °A.P.I.	58.0	56.7	54.2	57.7	57.6	68.0
Boiling range, °F.	158-387	226-350	182-402	108-392	132-399	106-359
R.v.p., lb.	1.9	0.5	0.4	5.4	5.0	6.6
Sulfur, per cent	0.11	0.06	0.03	...	0.02	0.01
Characterization factor	12.09	11.95	11.95	11.99	11.95	12.30
Molecular weight	119	116	125	112	112	98
Octane rating:						
Motor method (F-2):						
Clear	24	41.8	34.6	48.9	50.1	56.8
With 3 cc. TEL	39.7	62.9	59.1	69.8	73.3	78.9
Research method (F-1):						
Clear	24.9	39.2	34.8	49.5	54.6	57.2
With 3 cc. TEL	41.2	61.3	60.3	70.0	74.5	80.0
Properties of product reformate:						
Yield, volume per cent charge	93.0	94.1	91.3	93.0	93.1	90.5
Gravity, °A.P.I.	58	57	53	55	57	70
Boiling range, °F.	100-410	100-370	98-410	100-430	102-415	95-375
R.v.p., lb.	9.5	9.4	8.4	10.1	9.5	10.0
Sulfur, per cent	0.01	0.006	0.003	...	0.002	0.001
Octane rating:						
Motor method (F-2):						
Clear	77.0	75.7	78.3	77.2	78.2	77.0
With 3 cc. TEL	87.5	87.3	88.5	88.8	89.2	89.5
Research method (F-1):						
Clear	81.5	80.6	84.7	84.3	85.0	80.9
With 3 cc. TEL	92.5	92.2	94.5	95.1	95.0	93.5

A.P.I. DIGESTS

Refining Division Meeting, Houston, April 4–7

1. Rapid Methods of Analysis

The Determination of Dyes in Aviation Gasoline

B. B. BUCHANAN, J. A. FAVRE, M. D. GRIMES, and B. J. HEINRICH, Phillips Petroleum Co., Bartlesville, Okla.

A RAPID method has been developed by use of a photoelectric colorimeter for the quantitative determination of dyes in aviation gasoline. The method is suitable for analyzing gasolines containing one or two dye components. For samples containing one dye, the transmission is measured with a colorimeter using one filter, corresponding to the absorption peak of the dye. For gasolines containing two dyes, the transmissions are measured using two filters, corresponding to the absorption peaks of the two dyes. Using the transmission measurements, dye content is calculated by a single equation for the one dye and by simultaneous equations for the two dyes.

With care and strict attention to detail, duplicate results will not differ from the mean by more than 0.1 mg. of dye per gallon of gasoline. The accuracy of the method is approximately 0.1 mg. of dye per gallon of gasoline in the range from 1 to 10 mg. of dye per gallon.

Combustion Analysis of Liquid Materials

W. S. YOUNG, Atlantic Refining Co., Philadelphia.

CONTROLLING the vaporization rate of liquid samples during the conventional combustion analysis frequently becomes a troublesome problem, particularly when liquids of widely differing volatility are encountered. Although lack of control ordinarily manifests itself as errors resulting from incomplete combustion, often it is also the cause of damaging explosions occasioned by mixtures too rich in combustible material.

The method described largely avoids these difficulties, and is applicable to the combustion of liquids for determining elementary composition; and for this purpose it has the advantages of simplicity, speed, ease of control, accommodation of a wide volatility range, and relative safety over the ordinary method. Briefly, it consists of feeding liquid sample from a weighed vessel through a fine capillary tube into a combustion-tube zone sufficiently hot to cause immediate vaporization and consumption of the small droplets issuing from the tube end. (See accompanying figure.) Flow of combustion products proceeds from that point in the usual fashion through conventional catalytic and purifying zones in the combustion tube.

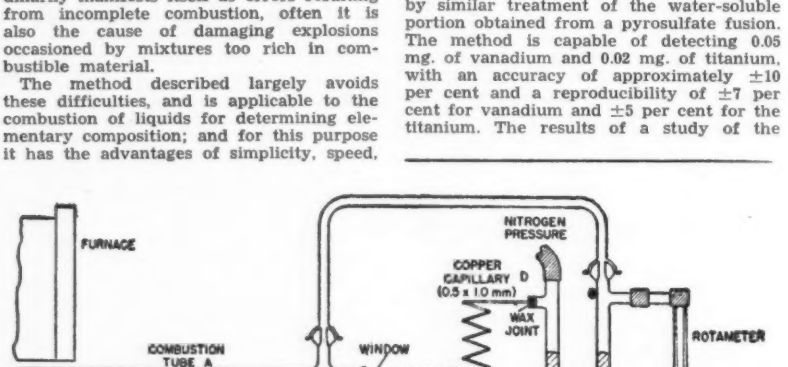
At present the method has been applied to carbon, hydrogen, sulfur, and halogen determinations with reproducibility satisfactory for routine purposes. Under ideal conditions one operator can finish between 15 and 20 analyses per 8-hour day.

In next week's issue will appear a special symposium of four of the A.P.I.-Houston refining meeting, devoted to various phases of the subject, "Refinery Maintenance."

Colorimetric Determination of Vanadium and Titanium in Petroleum Ashes

J. H. KARCHMER, Humble Oil & Refining Co., Baytown, Tex.

A METHOD is described for the determination of vanadium in petroleum ashes by photometric measurement, using a filter-type instrument, of the intensity of the orange-brown color of the vanadium-peroxide complex which is produced when the water-soluble portion of a mixed carbonate fusion is treated with an excess of sulfuric acid and with hydrogen peroxide. Titanium is determined in a like manner by similar treatment of the water-soluble portion obtained from a pyrosulfate fusion. The method is capable of detecting 0.05 mg. of vanadium and 0.02 mg. of titanium, with an accuracy of approximately ±10 per cent and a reproducibility of ±7 per cent for vanadium and ±5 per cent for the titanium. The results of a study of the effects of other elements, and of time of standing, temperature, concentration of the peroxide and of the acid on this color complex, are presented.



Capillary-tube combustion apparatus

The Spectrophotometric Determination of Tetramethyl Diamino Diphenyl Methane In Oils and Greases Using Nitrous Acid

R. M. OLIVER, present address, Roswell, N. M., and S. WALTER DENTON and JOHN T. WILEY, The Texas Co., Port Arthur, Tex.

A RAPID simple colorimetric method for the determination of tetramethyl diamino diphenyl methane in oils and greases is presented, along with results showing its accuracy and precision. The method involves extracting a 200-e.p. naphtha solution of the sample with dilute acid, reacting the extract in appropriate acidity with a small amount of an aqueous solution of sodium nitrite, and determining the transmittancy on an alcohol-water solution of the yellow products at a wave length of 420 mμ.

Computing Recorder for Infrared Spectra

ROBERT W. FOREMAN and WARREN JACKSON, JR., chemical and physical research division, Standard Oil Co. (Ohio), Cleveland.

A SIMPLE electrical instrument is described which substantially reduces the time required to obtain "per cent transmission" from the single-beam type of recording infrared spectrophotometer. This instrument automatically computes the ratio of sample-cell transmission to blank-cell transmission, and permits the conventional potentiometer recorder to plot percentage transmission of a sample directly. The computer incorporates a manually operated variable-voltage supply. This furnishes previously recorded e.m.f. blank-cell data to a continuous-balance recording potentiometer at the same time that the spectrophotometer furnishes the variable e.m.f. data for a cell-containing sample. The tedious and slow procedure of point-by-point computation of ratios from sample-cell and blank-cell curves is eliminated.

The apparatus is simple and rugged in construction. It requires very little dexterity to operate it. It is electrically stable, and yields data sufficiently reproducible for quantitative analysis. The saving in computational time for a spectrum, from 2 to 15 μ, amounts to approximately 4 to 5 man-hours per sample analyzed.

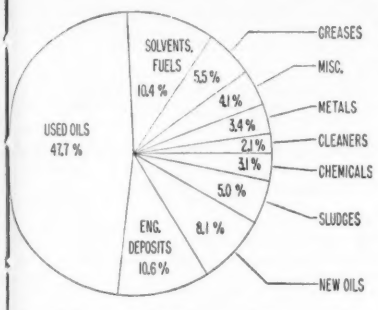
Rapid Analyses by Means of Emission Spectroscopy

HAROLD K. HUGHES, J. W. ANDERSON, R. W. MURPHY, and J. B. RATHER, JR., technical service department, Socony-Vacuum Laboratories, Brooklyn.

THE emission spectrograph has been found to be an extremely useful instrument for the handling of a wide variety of analytical problems at the technical service department of Socony-Vacuum laboratories. Not only does this method offer very distinct advantages from the standpoint of doing better and more complete analytical work, but it also is characterized by important time-saving features, and it offers the most efficient means of performing many types of analyses.

Until quite recently this instrument was chiefly considered a research tool. The present trend, however, is in the direction of utilizing spectroscopic methods to solve many of the practical every-day analytical

roblems which arise in the larger petroum laboratories. This report has been prepared for the purpose of presenting signifiant information with regard to the utiliation of this method by the inspection ivision of the authors' laboratory.



Percentage of emission spectroscopy samples tested

During the past 3 years there has been steady growth in the number of samples which have been handled by this method. In 1948 a total of almost 3,400 samples was processed through the spectroscopy laboratory, the average number per day being approximately 13. These samples include used and new oils, deposits, sludges, light products, greases, metals, and bearings, as well as an exceptionally diversified list of miscellaneous materials. On the average, the total actual handling time for 1 samples spectroscopically is about 4 manhours. One of the purposes of this report is to show that there are many applications for emission spectroscopy in he field of petroleum analysis. The increase n the number of samples that is being handled is not only indicative of the latter fact, but also of the increasingly important place that spectroscopy occupies in he sample-analysis activities of the petroeum industry.

Noteworthy progress is being made in the development of quantitative analytical procedures using this method. At present one of the most important projects being undertaken is an investigation of a method for determining the metallic portion of additives in unused detergent-type oils. Ultimately such procedures may become sufficiently attractive to justify installation of small instruments at refinery laboratories.

It is conservatively estimated that the investment in the spectroscopic operation at the authors' laboratory is returned twice a year as a result of the introduction of such analyses of all ashes.

Some conception of the number of types of materials which are received by the authors' laboratory may be obtained from he accompanying figure. As revealed therein, automotive samples are a large fraction with new oils (8.1 per cent), used oils 47.7 per cent), engine deposits (10.6 per cent), and crankcase sludges (5.0 per cent)—totaling 71.4 per cent. The analysis of light products is currently running at 10.4 per cent. The remaining 18.2 per cent of the samples is distributed as shown.

Some Microphysical Apparatus And Methods for Inspection Of Petroleum Products

J. V. SOMMER and G. E. C. WEAR, Esso laboratories research division, Standard Oil Development Co., Elizabeth, N. J.

THIS paper describes three apparati and procedures that have been developed o enable the carrying out, on a microcale, of three common inspection tests employed in evaluating petroleum products. These are the determination of density or specific gravity, viscosity, and Engler distillation.

Density is determined by a capillary-pycnometer technique requiring 0.03 ml. to 0.05 ml. of sample. This procedure may be applied in general to liquid products as found in the petroleum industry, with the exception of those which are extremely volatile or viscous.

The distillation procedure has been devised to give data comparable to those obtained by the A.S.T.M. naphtha-distillation procedure D-86-46 and the gas-oil distillation procedure D-158-41. Distillation flasks have been designed to accommodate a charge of 3, 5, or 10 ml., depending upon the amount of sample available.

Viscosity is determined by means of a thermostatically controlled inclined capillary-tube viscosimeter for which the volume of sample taken is 0.08 ml. The angle of inclination is adjusted to give a suitable efflux time, depending upon the viscosity range of the material being examined.

The Determination of the Furfural Content of Lubricating Oils

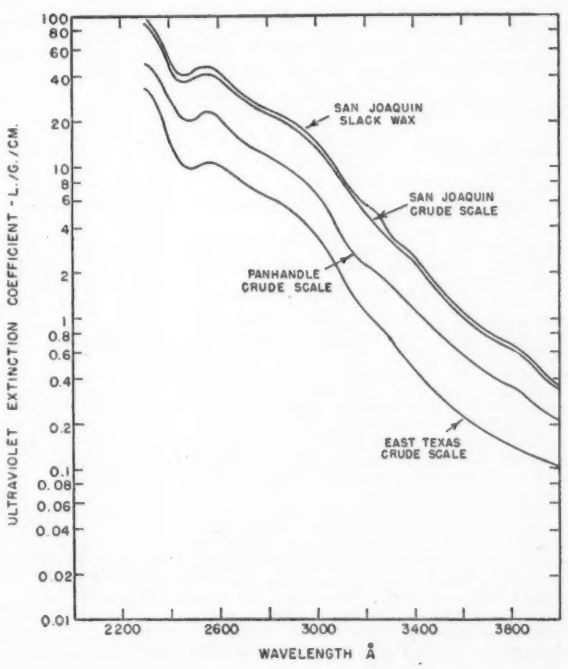
A. R. JAVES, Anglo-Iranian Oil Co., Ltd., Sunbury-on-Thames, Middlesex, England.

A SIMPLE colorimetric method is described by which semiskilled operators can determine in 5 minutes the approximate furfural content of lubricating oils. The test conditions can be altered to suit the range of furfural contents under consideration. The method has been used for concentrations between 0.0001 and 1.0 per cent, but it can be adapted for use outside these limits.

Determination of Oil in Petroleum Waxes by Ultraviolet Absorption

W. A. DIETZ, S. H. DOLE, and W. PRIESTLEY, JR., Standard Oil Development Co., Linden, N. J.

THE application of ultraviolet extinction measurements to the determination of oil content of petroleum waxes is presented. This method correlates very well with the conventional procedure for oil content, A.S.T.M. D-721-47. Using this method, it is possible to determine an oil content to ±0.1 per cent accuracy, in 1 hour or less. It is applicable over the entire range (0 to 100 per cent oil), whereas the conventional M. E. K. (methyl ethyl ketone) procedure is not reliable beyond 10 per cent oil content. Inasmuch as the ultraviolet extinction coefficient varies with crude source, a separate correlation must be determined for each base stock.



Ultraviolet spectra of aromatic from silica-gel extraction of waxes

Determination of Carbon On Cracking Catalyst by The Leco Method

GEORGE E. SCHMITKONS, research department, Standard Oil Co. (Indiana), Whiting, Ind.

IN the Leco method the quantity of carbon dioxide from combustion of a sample is determined volumetrically with a special burette which permits reading the volume of caustic-soluble gas as per cent carbon in sample. This method is used extensively in the determination of carbon in steel, and has been further developed and refined for the determination of carbon in catalyst. The method is now being used for research and plant-control work in catalytic cracking, where it has proved to be capable of a high degree of precision and accuracy, with shorter elapsed time, as compared with conventional gravimetric procedures.

By this method, in which the analyst can follow the progress of combustion, much has been learned about the technique for complete and rapid combustion of carbon from catalyst, which is largely applicable to the gravimetric as well as to the volumetric method. The coke must be burned from the pores of the catalyst particle in such a way as to avoid entrapping significant amounts of carbon. Fast combustion is safely achieved by proper choice of oxygen-flow rate and temperature. The Leco instrument permits rapid measurement of the carbon dioxide, and the analyst can be positive that all of the carbon dioxide from the sample has been measured.

The Use of a Porous-Cup Electrode in the Spectrographic Analyses of Lubricating Oils

A. G. GASSMANN and W. R. O'NEILL, Ethyl Corp., Detroit.

THIS paper discusses the results obtained by spectrographic analysis for phosphorus in lubricating oils, using two different means of introducing the oil sample into the spark. In the first method electrodes were prepared by heating graphite

rods to white heat and quenching them in the oil to be analyzed. It was found that this method gave satisfactory results as long as the same base oil was used, but it did not give satisfactory results for all oils. In an attempt to minimize the difficulties encountered using quenched electrodes, a method was developed in which the oil sample, contained in a porous graphite cup, entered the spark without being previously heated. This paper discusses the difficulties encountered using oil-quenched electrodes; describes the development of a method using porous-cup electrodes which minimized these difficulties; and compares the results obtained by both methods.

Spectrographic Analysis of Gas Oils and Crudes for Metallic Constituents

M. J. MURRAY and H. A. PLAGGE, Universal Oil Products Co., Riverside, Ill.

A SEMIQUANTITATIVE determination of the metallic constituents of gas oils and crudes using a spectrographic method is described. One hundred milliliters of the gas oil, or a smaller quantity of crude, is ashed in a platinum dish containing about 20 mg. of an especially prepared purified silica as "ash aid." A sectored spectrogram of a weighted quantity of the silica-ash mixture is taken with the direct-current arc. This spectrogram is compared, in turn, with sectored spectrograms of synthetic samples in which purified silica is the matrix. By use of silica as internal standard, the concentrations measured for the various elements in the ash are generally between the limits of half and twice the true value. This range of accuracy is usually all that is justified when the limitations of the sampling and ashing methods are considered.

Rapid Determination of Aromatics in Oil Fractions

IVOR W. MILLS, Sun Oil Co., Marcus Hook, Pa.

A RAPID and reproducible method has been developed for determining the aromatic content of viscous petroleum fractions. The method is based on the ability of silica gel selectively to absorb aromatics in the presence of paraffins and naphthenes, and it is applicable to samples having initial boiling points above 550° F. The accuracy of the method is within 1 per cent as established by analysis of known mixtures.

Determination of Free And Combined Iron in Cracking Catalysts

ROBERT E. SNYDER and RALPH O. CLARK, Gulf Research and Development Co., Pittsburgh.

IN general, the buildup of metallic constituents on cracking catalysts is of considerable interest to the petroleum technologist. Two such contaminants encountered are combined iron and, to a somewhat lesser extent, free or elemental iron. Analyses for these forms of iron were required for completion of certain process studies. The analytical methods that were developed in connection with this problem are described in detail.

The sensitive colorimetric reaction between orthophenanthroline and ferrous iron is employed as a basis for the estimation of the metal. For total iron, the catalyst is digested with hot hydrochloric acid or fused with potassium bisulfate; for free iron, it is treated with neutral copper-sulfate solution, and the excess copper removed by displacement with pure aluminum. Hydroxylamine hydrochloride is added; the pH of the solution is adjusted with an acetate buffer; and the ferrous phenanthroline-colored complex is developed.

The applicability of the methods is illustrated by analyses performed on synthetically prepared samples of known composition, and on samples from a cracking unit. Discussion of the reliability of the analytical data is presented from the standpoint of diverse ions and compounds.

2. Refinery Wastes

A Method of Conditioning of Refinery Effluent for Reuse And Disposal

F. M. FAULCONER, D. L. McCANN, and H. L. BEDELL, Socony-Vacuum Oil Co., Inc., White Eagle Division, Augusta, Kans.

A DESCRIPTION of a method of partial conditioning of petroleum-refinery effluent for reuse and disposal as applied in the operation of a skimming and cracking plant is presented. The method involves a process of collection, cold process-water treating, and filtering to soften the water, to remove oil and solids, and for the return of the water to the plant cooling system. In the recirculation of the water within the plant, a higher concentration of dissolved solids is permitted so that the total effluent which must be eliminated from the plant is reduced to a minimum. This effluent is finally treated to remove all evidence of oil and most of the other contaminants. The water has little odor; it generally has a good appearance; and it contributes no deleterious effects to the local surface-drainage streams.

Oil Separator for Refinery Waste-Water Disposal

G. E. KING, technical service division, The Standard Oil Co. (Ohio), Cleveland.

A NEW oil separator, serving the refineries of Pure Oil Co. and Standard Oil Co. (Ohio) at Toledo, was placed in operation in August 1947. The separator includes a distribution chamber and 20 final chambers. Basically, a unitary chamber was installed, but two-stage removal of oil and sediment is accomplished. Factors leading to this design were: (1) effectiveness; (2) low available head; (3) large volume of water; and (4) economy. The design is based on the A.P.I. method outlined in the publication, Disposal of Refinery Wastes (1941). Plant surveys provided the data required for the design. Rainfall runoff volumes were calculated. The design was based on 35,000 g.p.m. of waste water and 10,000 g.p.m. of rainfall runoff. Tests showed that 26,500 g.p.m. was the maximum process flow, and that an additional 20,000 g.p.m. of rainfall runoff could be handled. Features incorporated include the distribution chamber and overhead skimmer-scraper units. The water enters the final chambers through submerged sluice gates and over full-width weirs. The flow can be controlled at several points. The separator is equipped to collect, transfer, and settle separated oil and sediment. Some minor modifications to the design have resulted from the operating experience. The new separator recovers 95 per cent of the oil entering the waste-water system. The suspended-solids content of the effluent approaches that of the receiving waters. The new separator has improved the quality of the refinery effluent, and has prevented the loss of oil.

The Biological Measure of Stream Conditions

H. RADCLYFFE ROBERTS, managing director, Academy of Natural Science of Philadelphia, Philadelphia.

THE subject of this discussion is the measurement of surface-water conditions by means of biological survey procedures and the practical application of such measurements.

A survey of this kind embodies the sampling of aquatic life in a stream or other surface water, together with the usual chemical and physical data that are obtained in standard water-analysis procedures. This survey offers the only comprehensive yardstick for measuring water quality. By using the aquatic life as indicators, one can determine:

1. Whether a stream can withstand a moderate amount of wastes.
2. Whether a stream is being damaged or needs protection.
3. What progress is being attained in a recovery program for a stream.

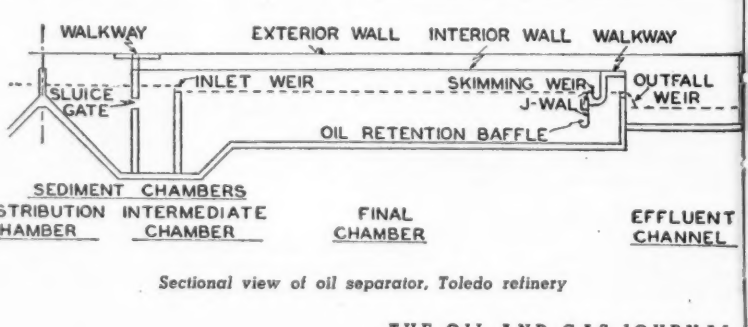
Methods are relatively direct or simple. To determine the effects of an effluent on a stream, a team of four to five people is employed. Survey time varies according to the place and circumstances; but generally, a survey of 8 to 10 sampling stations would take about 3 weeks of field and laboratory work, plus about 10 days to put the results into a report.

The facilities necessary for a team are a light truck with a small boat on a trailer, and a moderate-sized room with water and electrical services where a temporary laboratory workroom can be set up. All of the sampling and laboratory equipment can be readily transported by the team.

Disposal of Spent Chemicals From Petroleum Refining

L. C. BURROUGHS, assistant to vice president for manufacturing, Shell Oil Co., Inc., New York, and R. W. CARNAHAN, manager, effluent-control department, Shell Oil Co., Inc., Wood River, Ill.

AIMED at reduction and control of stream pollution new federal and state laws are bringing increased pressure upon industries to clean up their waste water before discharge. Byproduct and spent chemicals are the chief polluting constituents of these effluents. This paper discusses the effects upon surface waters, and describes procedures and equipment used successfully for disposing of the most common types of refining chemicals—including spent caustic soda, sulfuric-acid sludges, phenolic wastes



Sectional view of oil separator, Toledo refinery

hydrogen sulfide, spent catalysts, mercaptans, and sulfide-bearing waters from refining units. The importance of minimizing spent-chemical production by complete utilization of all chemicals is stressed. It is the primary purpose of this paper to furnish information which will serve to guide the refiner along lines of established good practice in designing his waste-chemical disposal facilities.

3. Training Programs

The Payout of Employe Training

ALEX S. CHAMBERLAIN, Ashland Oil & Refining Co., Ashland, Ky.

TWO important phases of refinery vocational training are discussed in this paper. The mechanic-apprentice program described has proved to be of great value because it increases efficiency of job performance, improves morale, and eliminates disputes with the union over disqualification of employes for advancement. Apprentices who complete the program make good mechanics, and the unsatisfactory men disqualify themselves. It costs the company about $450 per man to provide a 3-year apprentice course. Careful selection of apprenticeable material through aptitude testing is an important feature of the plan.

A training program for refinery operators which has really achieved worthwhile results is outlined. A company educational policy is also discussed. This plan, primarily of a home-study nature, is designed to assist employes in self-improvement—directed along the line in which they may advance in the company.

The company spends somewhere between 0.1 and 0.2 per cent of payroll on these various training programs. Approximately 5 per cent of the company's total number of employes are enrolled.

Highlights on Some of the Challenges Indicated by the Survey on Refinery Training Practices

HARRY D. KOLB, training division, Esso Standard Oil Co., New York, chairman A.P.I. Committee on Training in Refining.

NORMALLY those members of management interested in analyzing what actions they are taking to improve their operations through training have as a basis of comparison only isolated reports of actions taken by individual plants. Often in such a case the basis of comparison may be faulty, because such factors as need, geography, facilities, size, custom, and preference strongly influence the training practices of an individual plant.

For the first time it is now possible to take a searching look at training in the entire petroleum-refining industry in the United States. What is apparent from this survey may surprise many who have perhaps taken for granted the idea that training is in an advanced stage of development in the refining industry. In the smaller refineries, for example, many plants have no formal training programs at all. Many a plant which has provided means to train supervisors, or mechanical personnel, has no organized method of training operators, engineers, or clerks. Whether there is a valid need for training in such cases is a question which remains for the individual plant to decide. Many of these plants felt the need was there—but explained the inaction as a result of either lack of knowledge of the training techniques to use, or a lack of manpower to do the job. Therein lies a challenge. If the training techniques are sound, the results should so far outweigh the cost that management would feel it could ill afford not to provide the

The Establishment and Application of a Job-Training Program

E. G. HECKENDORF, The Texas Co., Port Arthur, Tex.

THIS paper covers the underlying problems responsible for the formulation of a rather extensive job-training program, its establishment and administration, training materials utilized, application of the program to process operations, and follow-up procedure for its continued use. The method by which training is accomplished includes the extensive utilization of an elaboration of the standard "job-instruction training" procedure. The training program provides for the attainment of knowledge requirements by the use of what is referred to as "basic training" and proficiency in work processes through "job training."

4. Other Subjects

Hydrogenation-Plant Steels

GEORGE A. NELSON, engineering department, Shell Development Co., San Francisco.

MANY of the important chemicals of today's industrial economy require processing in the presence of hydrogen, at elevated temperatures and pressures, at some stage in their manufacture. The more familiar ones are: ammonia, methanol, edible oils, and higher alcohols. In the petroleum-refining field, hydrogenation processes are becoming more and more important. Whereas in past years the hydrogenation of diisobutylene to isooctane supplied an important aviation-gasoline component, today some refiners are hydrogenating cracked gasoline and light fuel oils for stability improvement and to reduce sulfur. Others are catalytically reforming heavy naphthas in the presence of hydrogen (hydroforming) for octane-number improvement, a development which was spurred by the need for synthetic toluene during the war. In the future it can be anticipated that greater need for hydrogenation processes may arise: for example, hydrodesulfurization of crude oils or fractions therefrom, hydrogenation of carbon monoxide (Fischer-Tropsch), and destructive hydrogenation of oil residues or coal (Bergius process). These processes operate at high temperatures and pressures, where ordinary steels have their limits for safe operation. Although high-alloy steels can be used under these conditions, oftentimes more reasonably priced low-alloy steels are satisfactory. This paper summarizes the results of experimental tests and data from operating plants, from which it is possible to establish practical operating limits for carbon and alloy steels for all degrees of severity of service. Additional corrosive effects by sulfur and ammonia are also discussed.

The Determination of Dyes In Aviation Gasoline

B. B. BUCHANAN, J. A. FAVRE, M. D. GRIMES, and B. J. HEINRICH, Phillips Petroleum Co., Bartlesville, Okla.

AVIATION gasolines are marketed in several different colors, each of which is distinctive for a particular grade of fuel. Thus grade 80 is red, grade 91/98 is blue, grade 100/130 is green, and grade 115/145 is purple. The function of the color is to effect a means of identifying one grade from another. One problem confronting the aviation-gasoline industry today is the instability of the colors of the fuels. Color changes have been reported so pronounced that, for example, grade 91/98 (blue) has been mistakenly identified as grade 115/145 (purple).

A fast, accurate method for analyzing the fuel for its dye content is needed in order to study the causes for the change of color of aviation gasolines. As the analytical requirements involve the detection of changes in color, it was believed possible to solve the problem by using spectrophotometric methods. Gasolines containing one dye component are analyzed by measuring the transmission, using a photoelectric colorimeter, and obtaining the amount of dye present by referring to previously prepared standard curves. For gasolines containing a mixture of two dyes, the transmission is measured using two filters corresponding to the absorption peaks of the two dyes. From the transmission data for the two-component mixture, the amounts of each dye present are obtained by use of simultaneous equations. The method is applicable to gasolines containing 1 to 10 mg. of dye per gallon.

Corrosion and Stress Factors in Piping Expansion-Joint Failures

H. F. BROWN and W. M. GORYL, Standard Oil Development Co., Elizabeth, N. J.

THE purpose of this paper is to discuss several kinds of corrosion failures encountered in bellows-type piping expansion joints used in fluid catalytic cracking units, and to present methods of alleviating these failures by reducing stress levels through improved design.

Theoretical considerations and a mathematical analysis of expansion-bellows design are presented to show that a satisfactory joint for catalytic cracking unit service can be manufactured using a stabilized stainless steel (Type 347).

W.P.R.A. DIGESTS

Given here are summaries of two of the papers presented at the Western Petroleum Refiners Association annual meeting held at San Antonio, March 28-30. Two of the other W.P.R.A. papers will be found in this issue, on pages 90 and 95.

Hydroforming and Thermal Reforming Operations on Sweet and Sour Heavy Straightrun Naphthas

N. H. McLAURIN, C. M. McINTOSH, and D. S. KAUFMAN, The Texas Co., New York.

THIS paper presents the results of hydroforming and thermal reforming operations on sweet and sour heavy straightrun naphthas. Comparison of product distribution and yield-octane number relationships are discussed. Hydroforming is shown to have a better yield-octane relationship than thermal reforming. Reforming sour stock resulted in much higher octane improvement than reforming sweet stock. A comparison of the economics of the two processes on both stocks, based on direct operating costs, indicates relatively little difference in the two operations when reforming to a given octane level.

Investigation of Distillate Fuel Oil Stability

E. L. KORB, H. J. SCHEULE, and R. O. BENDER, petroleum laboratory, E. I. du Pont de Nemours & Co., Wilmington, Del.

THE storage stability of distillate fuel oils, particularly those derived from cracking processes, has received considerable attention from the petroleum and related industries. This paper presents some of the results of a study of the problem conducted in this laboratory during the past few years.

The principal reactions which may take place when fuels are stored are:

1. Oxidation reactions which produce compounds of higher, the same, or lower molecular weight. Metallic catalysts, especially copper, may accelerate these reactions.

2. Saponification reactions between organic acids and metals or metallic salts to form metallo-organic soaps. The acids may occur in the fuel oil as produced or be produced by oxidation of the fuel.

3. Condensation or polymerization reactions involving unsaturates from cracked fuels, or oxidation products, or both, producing high molecular weight compounds.

In general only those products of these reactions which are of high molecular weight or are corrosive are of interest in a study of the stability of distillate fuel oils.

It appears that the solvency of an aged fuel for its deterioration products, as well as the rate of deterioration, is important in a study of fuel-oil stability. A convenient way of expressing this solvency (S) in terms of numbers derived from accelerated or storage test data is as follows:

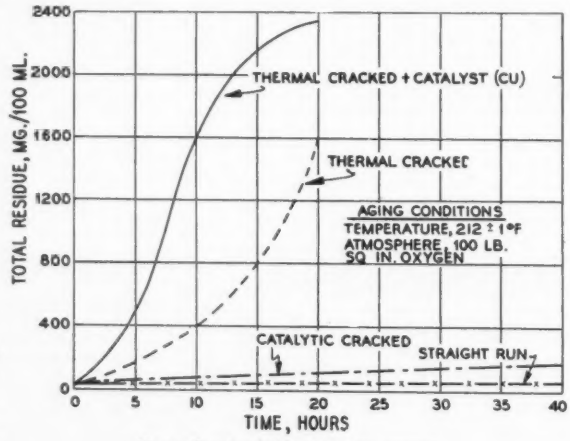
$$S = SR/TR$$

TR = total residue, soluble + insoluble, in mg./100 ml.

SR = soluble residue in mg./100 ml. (Aged fuel SR minus fresh fuel SR)

Each term of this formula is defined and methods for obtaining experimental values are briefly described.

Soluble residue, analogous to preformed gum in gasoline, is defined as the quantity of deterioration products which are dissolved in the fuel and are nonvolatile under test conditions. Unlike normal gasolines, however, some fresh fuels may contain hydrocarbons or other organic compounds.



Typical rate-of-deterioration curves

The accompanying figure shows typical rate of deterioration curves for a thermal cracked, catalytic cracked, and straightrun fuel. These curves represent data obtained by accelerated procedures, but similar curves could be plotted using different ordinates from data obtained from storage tests. It should be noted that although the solvency curves showed that thermal cracked stocks have more desirable solvency properties than the others, the rate-of-change curves for this kind of fuel show that it changes very much faster. It is necessary to balance the two factors in order to obtain an idea of the relative behavior of these fuels in storage.

'PLATFORMING'—New catalytic reforming process

(Continued from page 95)

combines many of the best features of both hydroforming and thermal reforming.

Platforming is like hydroforming in being a catalytic process in which hydrogen recycle is employed to suppress carbon formation. In platforming, however, this suppression is substantially complete, and the operation is continuous and nonregenerative, like thermal reforming. In platforming, naphthenes are converted to aromatics, high-boiling paraffins to lower-boiling ones, and low-boiling paraffins isomerized, thus providing a desirable reaction pattern for almost all parts of the charge.

The foregoing discussion explains in a general way how platforming can produce the results shown in Table 1. While the theory is relatively simple, its actual working out has been a long and difficult process. It has been necessary to obtain the proper balance between aromatization and hydrocracking and isomerization reactions, while maintaining conditions which suppress carbon formation. This has been accomplished largely by unusual techniques of catalyst manufacture.

The platforming process is applicable to all types of straightrun stocks in the gasoline boiling range. Typical results on a variety of stocks are shown in Table 2. It will be observed that platforming gives about 90 per cent sulfur reduction. The platformate has an end point slightly above that of the charge, but does not require rerunning. A.S.T.M. gum is low, and inhibitor susceptibility satisfactory. Of considerable interest is a road rating of 100 on a leaded platforming gasoline with a 95 research rating.

The plant is simple, involving merely a preheating and reactor section, a recycle gas compressor, and conventional fractionation for feed preparation and product recovery.

The installation cost for platforming is about the same as for thermal reforming plus polymerization. The operating cost is slightly greater than for thermal reforming plus polymerization for the same octane level. The substantial yield advantage for platforming makes this process more economical at octane levels as low as 85 research with 3 cc. of lead. The margin favoring platforming becomes increasingly great for higher octane levels.

BOOKS

WARTIME PRODUCTION CONTROLS. By David Novick, Melvin Anshen, and W. C. Truppner. Published by Columbia University Press, Morningside Heights, New York. 441 pp. $6.

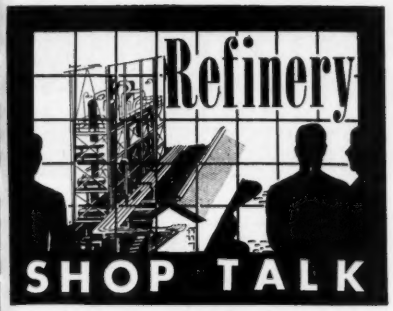
This book presents a critical appraisal of the techniques of production control devised and administered by the War Production Board and its predecessor agencies during the war years 1940 to 1945. It concentrates on a detailed analysis of the methods and procedures by means of which the wartime administration of the industrial economy of the United States was conducted. The book does not deal with the making of a policy. It deals with the machinery for carrying out policy decisions. It is the conviction of the authors that the major error in industrial administration, in the recent war, was the failure to appreciate the dominant significance of methods and procedures by means of which broad policies were made effective or permitted to fail.

THE INSTRUMENT MANUAL. Published by United Trade Press., Ltd., 24 Bridge Lane, Fleet Street, London, E.C.4, England. 548 pp. 70/s.

The object of this book is to provide in convenient form general information of value to all concerned with industrial instruments. It is a survey of the range of instruments in general use, and is intended for the use of those who choose the instruments, who place the orders, who install and subsequently maintain the instruments, and the plant operators who actually use them. In order to avoid too much reference from page to page or section to section, there is a slight amount of overlapping. The bibliography has been selected with a view to giving prominence to the work of the last 10 years.

TRADE-MARKS. By H. Bennett. Published by Chemical Publishing Co., 3 Court Street, Brooklyn. 479 pp. $10.

This book outlines the principles of trade-mark selection that will enable the reader to eliminate a great deal of time, money and effort usually involved in the choice of a trade name. The four different ways of finding or coining original names will make it easy to choose between a good and poor trade-mark. The difference between these is often equivalent to the difference between a mediocre and a highly successful business. The book is divided into three general sections: legal aspects, coining of trade-marks, and trade-mark dictionaries. In addition, a pocket on the inside of the back cover contains four name-finding wheels. Although the necessary information for the registration of trade-marks in the United States Patent Office is given, the author advises that the registration be handled by an attorney experienced in the field.



SUBJECT: What is the current situation in regard to heavy fuel oils?

DISCUSSION: (By Edwin F. Nelson, vice president, Universal Oil Products Co., from recent paper presented at Western Petroleum Refiners Association annual meeting, San Antonio.)

IN sharp contrast to the expanding demands for distillate fuels, heavy-fuel-oil markets are experiencing a steady decline. Perhaps the most important factor in this trend is the huge expansion in crude runs, particularly the heavier, heretofore marginal crudes, since the war, primarily to meet demands for other products. This has automatically produced a corresponding increase in heavy-fuel-oil supplies without a compensating increase in demand. The refiner is thus under increasingly heavy economic pressure to reduce his residual fuel production. A variety of methods are available to accomplish this object, depending upon the operations presently conducted.

Refineries that have only topping facilities have the following choices:

1. Adjustment of crude-tower operation to produce maximum amounts of distillates.

2. Installation of a vacuum unit to produce virgin asphalt. The wisdom of this step depends largely upon the asphalt markets to which the refinery has access.

3. Installation of visbreaking, thermal cracking, catalytic cracking, or coking units.

Refineries in which some of these processes are already installed have a correspondingly limited choice. Refineries without catalytic cracking facilities can achieve a very substantial reduction in residual-fuel production by installing such facilities. In a typical refinery processing Mid-Continent crude, this step will reduce residual fuel by 30 to 40 per cent.

Refineries presently operating catalytic cracking cannot readily accomplish further reductions of this magnitude, but careful surveys almost invariably reveal some possibility for improvement. The present market trend towards lower residual-fuel price has caused many refiners to consider the possibility of converting more refinery fuel gas into polymer gasoline and offsetting the reduction in fuel gas by burning pitch or residual fuel.

SUBJECT: What is the refiner's picture in petrochemical manufacture?

DISCUSSION: (By Edwin F. Nelson, vice president, Universal Oil Products Co.)

THE production of petrochemicals continues to expand, and most refiners who have not yet entered this field are looking at it longingly. There are, however, various difficulties which frequently appear on careful investigation. One of these is that the light olefins, which are the most important petrochemical raw material, are only available in sufficient quantities at rather large refineries. Another difficulty is the substantial capital investment involved in most petrochemical developments. The smaller refinery, however, may occasionally find the opportunity to dispose of raw materials to a nearby chemical plant, or even to carry out a limited amount of chemical manufacture. In the latter category, a number of refiners have found it profitable to modify their poly plant operations to produce propylene tetramer, which is an intermediate in detergent production.

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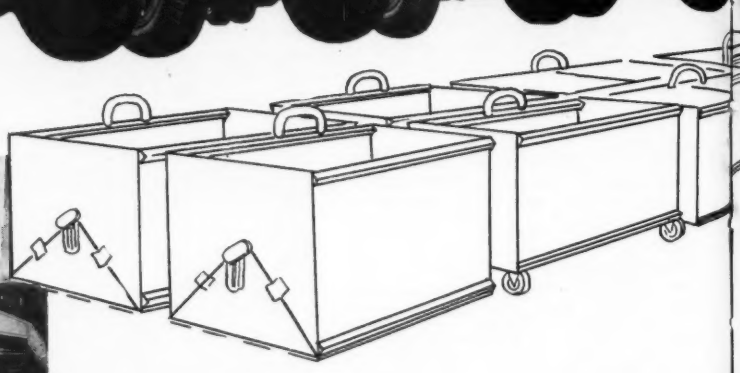

Like many industrial operations, this refinery extends over many acres and handles great quantities of materials, in addition to hundreds of cubic yards of scrap and rubbish daily. Choosing strategic points for receiving material, the 88 containers were placed throughout the refinery, the requirements at each point determining the size and number of containers to be used. At some points for liquid, water-tight containers with lids were required. At others, light, bulky waste called for a big capacity, light-weight enclosed container. Some accumulation points were inside buildings. Containers on casters that could easily be rolled indoors were provided. Each container is assigned to one of the four truck hoisting units and, on a synchronized schedule, is picked up as soon as it is filled. Photos at left show: top-truck hoisting unit backing up to a 6 cu. yd. Universal container. The driver attaches two chains, and then, from controls in the cab, the container is hydraulically lifted into carrying position (see photo at left center). Arriving at the disposal area, the container is automatically dumped (see photo left below). The container is then returned to its original point for reloading and the truck hoisting unit moves on to the next container on its route. Pick-up and dumping operations require only a matter of seconds, thus it is possible for one man and one truck to handle any number of containers, keeping a steady flow of material moving without waiting or wasting time.

On opposite page are illustrated the types of containers in the original installation and the materials they handle. Note how easily the basic Dempster-Dumpster containers are converted for special purposes by the simple addition of lids, casters or some other special change.

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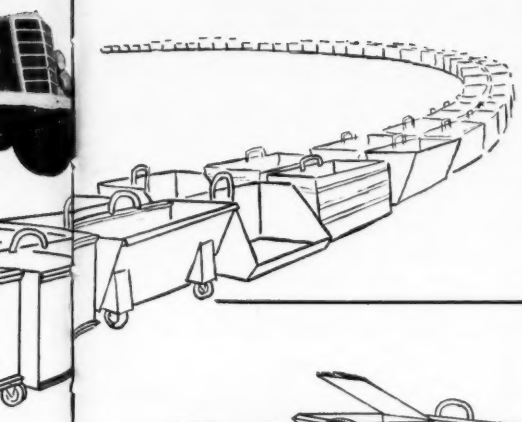
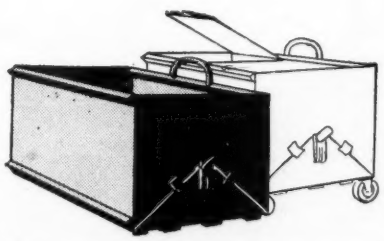
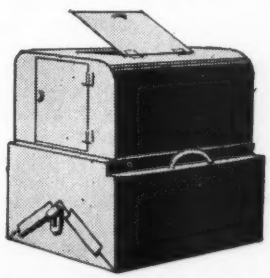


The Dempster-Dumpster System of Materials Handling, simply stated, permits the use of any required number of detachable containers, of various designs and capacities, to be serviced by a single truck. Its ability to effect tremendous savings in handling numerous types of materials has been definitely established in hundreds of leading industrial plants.

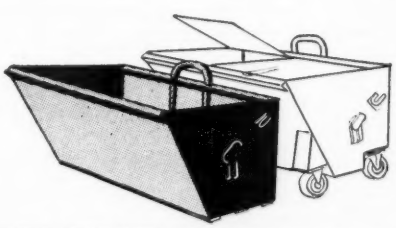
In this particular case, in a large refinery, four of the twelve trucks formerly detailed for materials handling, including scrap and rubbish collection, were equipped with Dempster-Dumpster Hoisting units to handle 88 detachable containers of 15 different types. The Dempster-Dumpster System of quick pick-up and dumping of pre-loaded containers has worked wonders in efficiency, plant appearance, and savings. In one year savings of over $58,000 was shown by our engineers survey. Time has proved the correctness of this survey. Since the original order of 88 containers, so many more uses for the equipment and greater savings were discovered that 55 additional containers have been placed in service with a grand total of 143 containers now being handled by the four trucks.



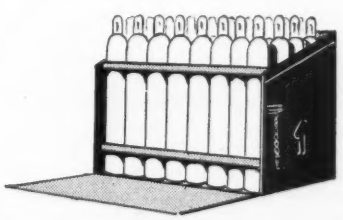
DROP BOTTOM CONTAINERS. 48 drop-bottom containers were furnished for handling trash and rubbish, steel turnings, scrap metal, tube ends and clay:—Twenty 6 cu. yd. open top type, one 6 cu. yd. with lids, nine 2½ cu. yd. open top type, two 2½ cu. yd. open top with casters, six 3 cu. yd. open top, nine 4 cu. yd. with lids, one 4 cu. yd. enclosed with hinged door in top.



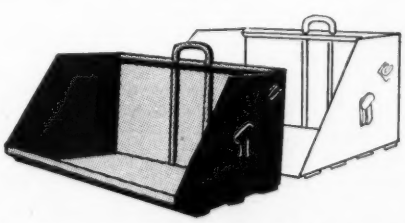
UNIVERSAL CONTAINERS. 13 universal containers were furnished for handling trash and rubbish. Universal containers feature completely enclosed construction, drop-bottom dumping, a door in either end for ground-level loading and a lid in the top for loading from a platform.



TILT TYPE CONTAINERS. 16 tilt type containers were furnished for handling general refuse, sludge and settlings:—Four 3 cu. yd. open top type, nine 3 cu. yd. with lids, three 3 cu. yd. with lids and casters.



SPECIAL CONTAINERS. 3 special containers were furnished for handling and transporting oxygen cylinders from one point to another in the refinery. This container is typical of the many highly specialized uses for which Dempster-Dumpster containers are constructed. Many other containers are available for handling almost any type of material known, be they liquid, dust, light or bulky or very heavy materials.



SKIP TYPE CONTAINERS. 7 skip type containers were furnished for handling refuse wax, oil, lube and coal:—Three 3 cu. yd. skip type with lid, three 3 cu. yd. skip type without lid, one 3 cu. yd. skip type with teeth.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Reclaiming Oil, Again—Part II

In last week's issue the question of P. H. H. concerning the reclaiming of oil, the methods used, and the quality of the product was discussed. It will be continued here.

In last week's issue (Part 1) it was pointed out that it is usually cheaper to purchase neutral oils and bright stock on the open market for the blending of lubricating oils, than to reclaim used oils. The quality of the reclaimed product is usually inferior to newly manufactured oils, but the reclaimed oils may be superior if complete re-refining is practiced. Solid debris, such as grit, dust, scale, carbon, etc., is present, and low-boiling volatile materials are found in crankcase oils. Finally, the products of heat, decomposition, and oxidation (asphalt in paraffin-base oils and sludge in naphthene-base oils) in the presence of metal scrappings (catalysts) are present. These are generally chemically active and may be corrosive.

Processing.—A consideration of the impurities just enumerated (and more completely in last week's issue) indicates clearly why many reclaiming processes of varying degrees of thoroughness are practiced. The following list of operations are arranged somewhat in the order of the thoroughness of the processing.

1. Mechanical filtration.—Solid debris can be removed by means of filters similar to the familiar filter cartridges used on automobiles and many engines. Even centrifuges are used in large diesel-power engine installations. The oil must usually be heated.

2. Adsorption filtration. — Fuller's earth or similar adsorbents may be used as a filter bed or in the form of a compressed hollow cylinder through which the oil must flow. Obviously, mechanical filtration is always used with the adsorbent filter. Adsorbents remove polymerization products, most oxidation products, most of the "additives" that were put into the new oil, and much of the asphaltic or dark colored materials.

3. Replace additives.—A process involving 1 and 2 is very common and is satisfactory in many instances although the oil so produced is not usually the equal of new oil. Even if the additives for improving the pour point, viscosity index, oxidation resistance, detergency, corrosiveness, etc., are replaced in the oil, it is still not entirely purified. Obviously, the additives cannot easily be introduced into a closed circulation system such as those used on large engine installations.

4. Complete reprocessing. — This is the method required in producing a truly superior reclaimed oil. It involves the following general operations:

(a) Mechanical filtration as in 1.

(b) Flashing at atmospheric pressure at a high temperature to remove volatile materials.

(c) Vacuum distillation to eliminate asphaltic, residual, or polymerized materials as a residue.

(d) Acid treatment, adsorbent filtration, solvent extraction, or other means of removing reactive impurities and improving the color.

(e) Replace additive agents.

As an alternate the vacuum distillation (item c) can be eliminated. This results in a smaller plant cost and a simpler process, but the operating cost for chemical treating agents, etc., will be larger. In general, the complete reprocessing indicated here is the same as the operations conducted in a refinery except for dewaxing. Incidentally, the reclaimed oil cannot have a low pour point unless the charge stock (crankcase oil) contains no high pour-point oil.

No extensive records of the amount of reclaiming that is practiced are available. Obviously, mechanical filters (method 1) are widely used on automotive equipment, and they are installed as a part of nearly all large engine installations. Likewise, some of the filter cartridges used on automobiles and most of those used on engines contain adsorbent materials and hence the second type of treatment (2) is also widely used. In addition, it is estimated that less than 5 per cent of the total lubricating oil consumed has been produced by the reclaiming of crankcase oil by the method of mechanical and adsorbent filtration. Obviously, such reclamation operations can only be practiced if large amounts of crankcase oils are readily available so that gathering charges are small. The complete reclaiming of oils is probably practiced by very few operators.

A discussion of the many trade names or patented equipments might be added to this discussion except that information can be had only with great difficulty. Advertising literature is readily available and all manner of claims are made.

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A few references are shown at the end of this discussion and here are a few selected patents:

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(b) Reclaiming Lubricating Oil from Crankcase, Dec. 19, 1927, p. 248.

(c) Composition of Crankcase Oil, July 12, 1928, p. 156.

(d) Removing Acid from Recovered Crankcase Oil, Dec. 27, 1928, p. 180.

(e) Disposal of Crankcase Oil, Jan. 3, 1929, p. 135.

(f) Quality Crankcase Oil by Hydrometer Test, Feb. 13, 1930, p. 84.

(g) Disposal of Crankcase Oil, Feb. 27, 1930, p. 84.

(h) Refining of Crankcase Oil Drainings, Mar. 27, 1930, p. 98.

(i) Quality of Re-refined Lubricating Oil, Jan. 22, 1931, p. 70.

(j) Reclaiming Crankcase Oil, Apr. 30, 1931, p. 66.

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(o) Reclaimed Oil . . . of Satisfactory Quality, May 7, 1936, p. 52.

(p) . . . Reclaiming Methods Seldom Adequate, May 28, 1936, p. 54.

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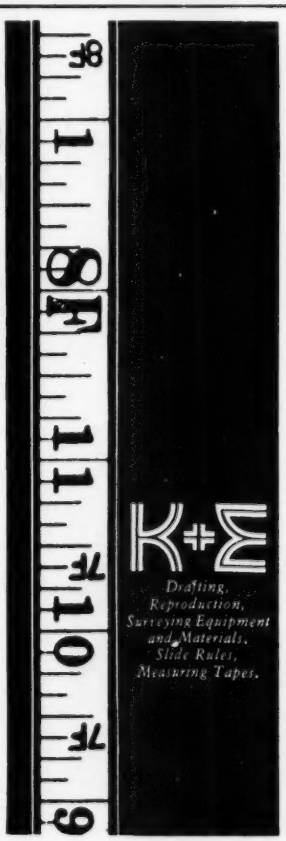

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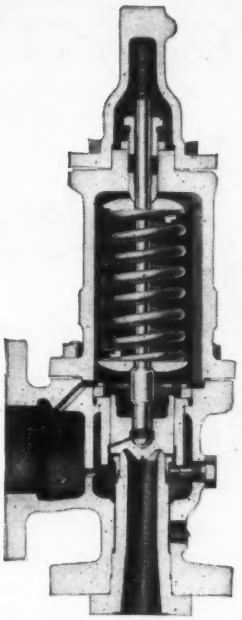

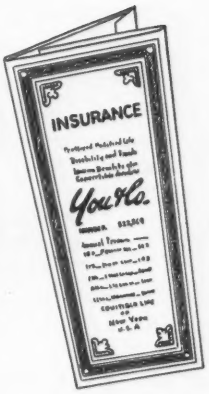

Insured Safety!

Insurance is wise. But it is a thousand times better to protect your plant and people, to avoid disaster and personal damage that money cannot replace.

Engineers who specify CONSOLIDATED Safety Relief Valves are doubly sure! For these valves provide extra safeguards available *in no other valve*—high fixed capacity, outside bevel seat and floating guide construction which assure maximum tightness even under discharging pipe stresses.

Simple design means 25% fewer parts and maximum interchangeability.

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IF YOU WANT YOUR CASING CENTERED—

Let These Ten Strong, Flexible Men Do The Job!

You don't send a weakling out to do a strong man's job. You don't tie up a battleship to a willow tree.

When you're controlling tons of weight you want strength, flexibility, durability. These qualities are yours in the Larkin Centralizer.

1. They have twice the usual number of staves . . . each stave twice as strong.

2. The offset staves provide 10 points of contact with the wall of the hole . . . a greater peripheral bearing without restriction of fluid passage.

3. The staves are riveted to the end rings . . . not welded . . . thus eliminating brittleness and resultant breakage while being run in the hole.

4. They are "tailor-made" to hole size. No time consuming on-the-job adjustment is necessary.

5. The positioning lugs, which are plug-welded inside each end ring, always pull the centralizer through possible well bore restrictions, yet allow the centralizer to rotate freely on the casing. Thus, **rotating, reciprocating or stationary,** the Larkin Centralizer is the tool to get the centering job done.

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ENGINEERING fundamentals

Equipressure and Flow Lines

THERE are many useful correlations arising from the analogy between Ohm's law for electrical flow and Darcy's law for fluid flow. The correspondence between equipressure lines and equipotential lines and between fluid flow lines and current flow lines is especially useful. By delineating such lines in an electrical system, flow within a formation is often better understood.

In the following discussion, both pressure and voltage will be considered by the term potential and the ideas expressed apply to both electrical circuits and fluid-flow circuits.

In a system where there is a variation of potential flow can occur between any two points over which a potential difference exists provided there is no impermeable barrier of separation. Between two points where the potentials are identical no flow occurs. These two points then lie on an equipotential line or surface. In fact the usual method of locating equipotential lines is to plot those points in a system across which no flow is measured.

Although flow may occur between any two points not on a common equipotential line, a given fluid or electrical particle will not necessarily move between any two such points in a system. The direction of flow a particle will take is governed by the relative amount of potential differences. This is a matter of common experience with the drainage of water on a topographic surface. Water will not necessarily drain from a given point high on the surface to a given point low on the surface unless the slope between the two points being considered is the maximum.

It is a general principle that flow through a system will be in the direction in which the potential gradient is a maximum. A fluid particle, therefore, always moves in a direction at right angles to the equipotential line on which it rests because the gradient is a maximum in the perpendicular direction. The path that a given fluid particle follows as it moves through the system is called the flow line. Just as the spacing between equipotencial lines indicates a changing gradient, so the divergence or convergence of flow lines indicates a decrease or increase in flow capacity.

These concepts are indicated in the accompanying diagrams. Fig. 1 shows the changing density of equipressure lines as equivalent to a change in pressure gradient, and also shows the convergence of flow lines in the direction of flow as an increase in flow rate. Fig. 2 shows equipotential and flow lines for a portion of a well system where the position of equipotential lines was drawn by analogy to an electrical model and the flow lines were drawn orthoganally to the equipotential lines at every point of crossing.

The idea of flow direction at right angles to equipressure lines can be applied to the migration of fluids within a reservoir from a pressure map. In such an instance, however, the flow picture applies only at the time the particular pressure distribution applies. Fig. 3 is a map of reservoir pressure on a particular reservoir with arrows indicating the direction of flow regionally throughout the reservoir.

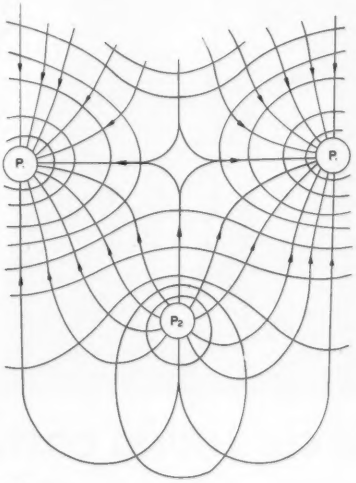


Fig. 1—(Below) Equipotential lines and flow lines. Spacing of equipressure lines is gradient. Convergence of flow lines is increased flow rate. Equipressure lines and flow lines are perpendicular. Arrows show direction of flow

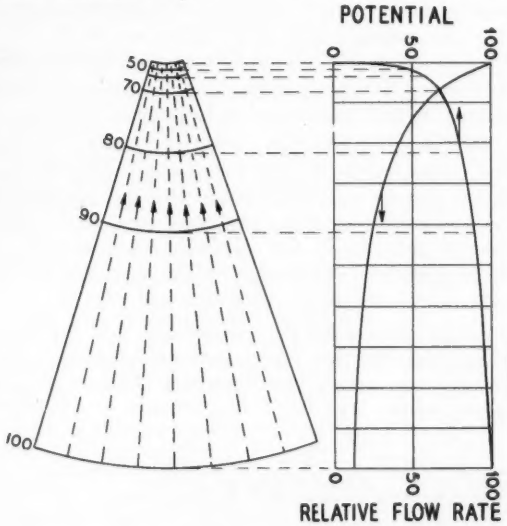
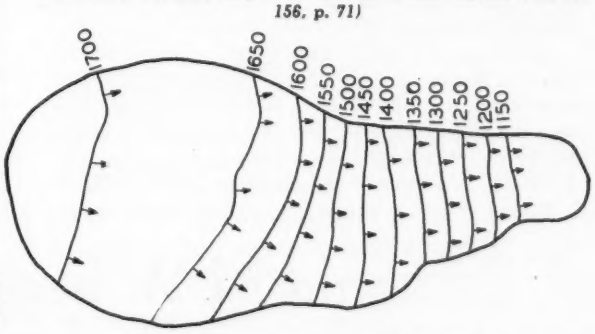


Fig. 2—(Center) Equipotential lines and flow lines from an electric model, $P_2 > P_1$. Arrows indicate direction of flow. (Reference: Proc. 7th annual tech. meeting, Bradford district research group, Min. Ind. Expt. Sta., Penn State College). Fig. 3—(Below) Equipressure lines for a reservoir. Arrows indicate direction of regional fluid flow at time of this particular pressure distribution. (Reference: Pressure map from A.I.M.E. Trans. reprint, Vol. 155-156, p. 71)



Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

N.B. While it is axiomatic that return on investment—the *ultimate earning power* of a refinery unit when actually on stream—is the only true evaluation of competitive engineering recommendations, initial plant costs remain a major factor in refiners' decisions on plant installations. M. W. Kellogg takes specific steps to *minimize initial plant costs* consistent with the achievement of *highest ultimate earning power.*

HOW KELLOGG CUT LINING COSTS BY OVER 50%

For many years, accepted practice has been to line regenerators with refractory tile and block insulation costing from $10 to $12 a square foot installed.

Kellogg design engineers considered this an unreasonably high expense and decided to pioneer a new type of vessel lining. Kellogg's refractory and insulating specialists consequently experimented with new materials and methods that would reduce this cost yet provide the same or better performance.

A solution was found in Kelcrete*, a new refractory material that can be "gunnited," or sprayed, on a wire mesh supported on the inner surface of a vessel. Not only is Kelcrete less expensive than tiling but it is also less costly to apply. *Total cost is about $4 a square foot installed*—more than 50% saving over old methods.

Furthermore, it exhibits excellent stability, although continuously exposed to temperatures of 1100° F... is longer lasting than other materials... and is easier to repair. Gunnited Kelcrete is now a standard material for this and similar applications in units engineered and constructed by Kellogg.

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Such completeness of organization and the close cooperation between the various specialists at M. W. Kellogg are the soundest approach to LOW INITIAL PLANT COSTS.

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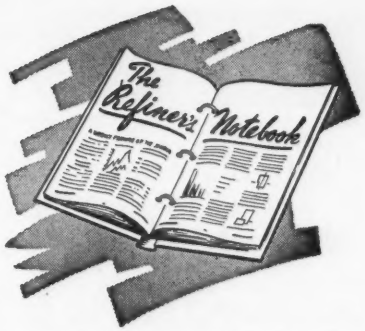
Cost-imating



A WEEKLY FEATURE OF THE OIL ANG GAS JOURNAL

Pipe Stills

APPROXIMATE COST INDEXES*
(1946 = 100)

	Material	Labor	M & L
1926	80	58	73
1928	78	57	72
1929	76	59	71
1930	68	57	65
1931	63	57	61
1932	60	48	56
1933	61	49	57
1934	62	55	59
1935	64	58	62
1936	66	60	64
1937	71	65	69
1938	67	67	67
1939	68	68	69
1940	70	69	70
1941	77	71	75
1942	80	79	80
1943	85	87	85
1944	85	90	86
1945	88	94	90
1946	100	100	100
1947	115	119	117
1948 (est.)	134	154	139

***Cost-imating No. 1, The Oil and Gas Journal, October 21, 1948, page 141.**

THE design of pipe stills has been radically altered in recent years by the use of longer tubes (fewer return bends) and by employing an upflow of gases directly into a short stack. Accordingly, costs of topping or distillation stills are now only 75-80 per cent of the cost of the older down-convection or box-type stills. Even pressure stills (cracking) are cheaper by 7-10 per cent, and of course, much cheaper than the older flue-gas recirculation stills. These lower costs (Fig. 1) are caused primarily by the superior arrangements of tubes now used, and have no relation to the current changes in the costs of material or labor. The small shop-assembled (200,000 to 6,000,000 B.t.u.) stills now available are even cheaper than the tailor-made stills shown in Fig. 1. All-radiant standard stills are at the low limits of Fig. 1 and special jobs are at the high limit.

The cost of stacks can be estimated by the weights of steel given in Cost-imating No. 3 (November 4, 1948, page 111) or No. 9 (December 16, 1948, page 113). A small amount should be allowed for erection and about 8 ft. of the hottest part of the stack should be insulated on the inside. An indication of the costs of steam boilers is given in Table 1.

References

1. Happel, Aries and Borns, Chem. Engineering, Dec. 1946, p. 97.
2. Author's files and private communications.

TABLE 1—APPROXIMATE COST (1946) OF STEAM BOILERS INCLUDING ERECTION AND STACK (NOT CHIMNEY) BUT NO BUILDINGS OR OTHER AUXILIARIES[1,2]

	Material	Labor	M & L
Oil field type, $ per rated horsepower			22-28
Refinery, 125-400 hp., $ per rated horsepower	35-70	22-27	64-90
Refinery, 300-800 hp., $ per rated horsepower	32-60	19-23	50-80
Refinery (8,000-30,000 lb. per hr.), $ per lb. per hr.	1.20-1.50	(*)	.....

*Labor and erection is 25-35 per cent.[1,2]

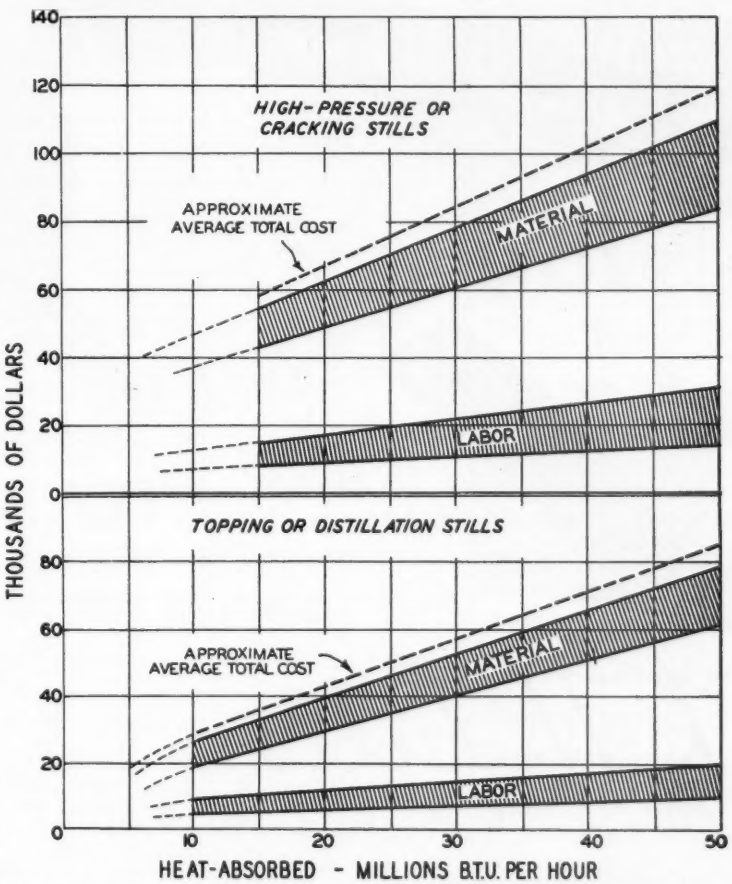
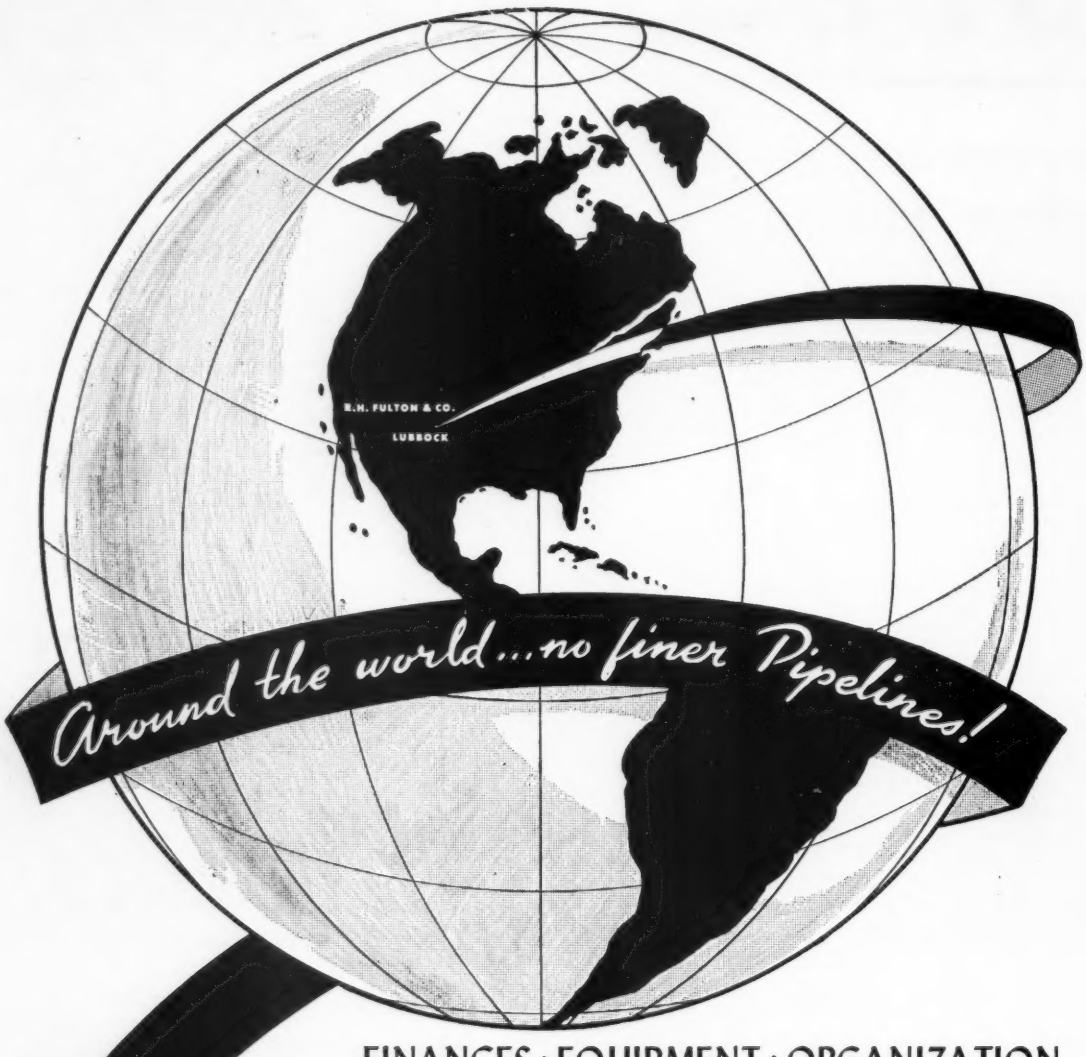


Fig. 1—Approximate costs (1946) of pipe stills. Short stacks are included on the top of upright stills but large stacks as on many types of stills are not included.[1,2] Carbon-steel tubes and bends

No. 25 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



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PIPE LINES

Queont Plans Line From Montreal to Toronto

TORONTO.—A 330-mile pipe line for petroleum products between Montreal and Toronto is projected by the Queont Pipe Line Co., subsidiary of British-American Oil Producing Co.; Shell Oil Co. of Canada; and McColl-Frontenac Oil Co. (Texas Co.) which will cost between $15,000,000 and $20,000,000. The proposed project will be financed largely, if not entirely, in Canada.

When completed, the line will carry petroleum products from refineries at Montreal to Toronto for distribution to Ontario Province points.

The project has been discussed here by a spokesman for the British-American Oil Producing Co. A petition has been filed at Ottawa for a special act to incorporate the project under general pipe-line legislation recently introduced in parliament.

The general legislation recently introduced by the federal government places oil and gas pipe lines operating internationally and interprovincially under the jurisdiction of the Federal Board of Transport Commissioners, which already has jurisdiction over railroads.

The Montreal refineries of the three companies have an aggregate capacity of 86,000 bbl. per day. British-American has refineries at Toronto and Clarkson in Ontario, totaling 15,000 bbl. McColl-Frontenac has a 12,000-bbl. refinery at Toronto. All three companies have extensive distribution facilities in Ontario.

In addition to the Queont line, four other Canadian pipe-line projects are being contemplated, involving expenditures of an additional $230,000,000, as outlined by Hon. Lionel Chevrier, federal transport minister, in a recent discussion of such lines.

Interprovincial Pipe Lines, sponsored by Imperial Oil, Ltd., and to be capitalized at $200,000,000, is planning to build an oil line from Edmonton to Regina. Expenditure on the first stage of this project will be between $35,000,000 and $40,000,000, of which around $10,000,000 will be spent this year. Primarily designed to handle crude from the Leduc and Redwater fields, the line may ultimately be extended to an unnamed point on the international boundary.

Three natural-gas transmission lines are also contemplated. Western Pipe Lines will introduce a bill to provide for construction of a natural-gas line from Calgary to Winnipeg and St. Boniface, Man. Cost of the project has been estimated at $48,000,000.

Alberta Natural Gas Co. is projecting a line from a point in Alberta to Vancouver, B. C., and Seattle, Wash., at a cost of approximately $100,000,000, to be financed from the United States. The Canadian end of the line will cost approximately $50,000,000.

West Coast Transmission Co. is planning a line to transport gas from Alberta to British Columbia and the State of Washington at a cost of between $50,000,000 and $100,000,000. This will be financed in the United States though the money will be spent largely in Canada.

Construction to Start on Texas Eastern Expansion

Construction work on Texas Eastern Transmission Corp.'s new expansion program, designed to increase capacity of its natural gas pipe-line system to 740,000,000 cu. ft. daily, will begin immediately, R. H. Hargrove, company president, reported. His announcement followed receipt of Federal Power Commission's order granting a certificate of public convenience and necessity for the new project.

Texas Eastern will lay 177.5 miles of 26-in. line looping the two existing "Inch" lines from the company's station near Lebanon, Ohio, to a point approximately 20 miles east of the station near Summerfield, Ohio. Also, 69.5 miles of 20-in. pipe will be built looping two sections of the Little Big Inch in Texas and Louisiana, and 100 miles of 16-in. line will be laid from Provident City field in Lavaca County, Texas, to the Baytown, Tex., terminus of the Little Big Inch.

Four new compressor stations will be built on this line at oil-pumping station sites near Beaumont and Newton, Tex., and near Many and Castor, La. They will develop a total of 17,500 hp. Changes also will be made at four Texas Eastern compressor stations in Ohio, and one in western Pennsylvania to increase the available power there by an additional 15,000 hp. At Lebanon, Ohio, a complete new 5,500-hp. reciprocating compressor station will be built near the present 14,000-hp. centrifugal station. These additions will bring the total number of compressor stations on Texas Eastern's system to 26 and the total effective horsepower of the system to 272,650.

Right-of-way has been acquired

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for the new pipe line projects in Ohio, Texas, and Louisiana, Hargrove reported. A total of 14,000 tons of 26-in. and 20-in. pipe has already been delivered and distributed at various points along the route. The entire program will require 62,000 tons of steel pipe, 14 new 1,000 and 1,100-hp. gas engines and reciprocating compressor units, and 15 centrifugal compressors with electric motors ranging from 1,250 to 2,000 hp. Total cost is estimated at $24,052,000.

Radio May Supplant Wire in Future Pipe-Line Operations

The possibilities for future use of radio for communication and control by pipe-line companies were explained by F. W. Littell, superintendent of communications and transportation, Shell Pipe Line Corp., Houston, at the March 21 dinner meeting of The Pipe Liners Club of Tulsa.

Anything that can be done over a wire line can be handled just as well by the use of radio, Littell said. With rapid progress now being made in the development of microwave systems it is possible that within the next 5 years the pipe-line industry will use this method of communication when new facilities are required. This will lead to discontinuing present practice of constructing privately owned pole and wire lines.

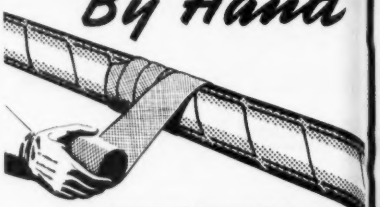
Attention was also called to new methods of pipe-line operation made possible by the use of radio. The desirabilty of using microwave radio communication was stressed for rendering voice communications from end to end, with the use of teleprinters, facsimile, supervisory controls, and the multiplicity of circuits for many other types of operation.

Expansion of pipe-line radio systems is being delayed pending release of the new Federal Communications Commission rules and regulations. However, present indications are that this release will be forthcoming within the next few weeks.

Under the proposed rules and regulations all frequencies assigned to the petroleum service are to be shared with the forest products radio service. It was pointed out that petroleum is the only major industry using radio on a large scale that is required to share the use of all its frequencies with other radio services. Almost every user of radio except the petroleum industry has some exclusive frequencies but the needs of the petroleum industry are just as great for exclusive frequencies.

To protect continuity of service it was also suggested that the new rules allow substitution without modification of license, any transmitter available regardless of manufacture, and regardless of tube and circuit arrangement so long as the transmitter meets the limitations of maximum power, emission, frequency tolerance, and total maximum deviation and is

FIGHTING CORROSION By Hand



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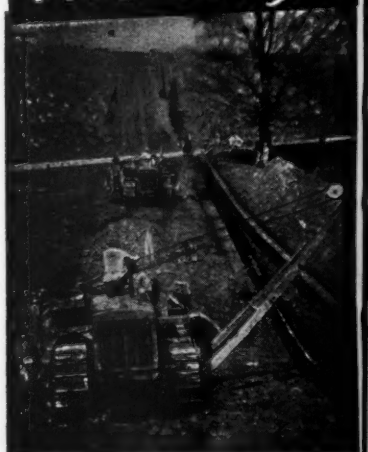

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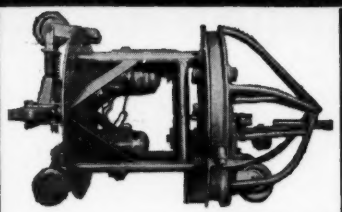
INTERNAL LINE-UP CLAMP



The electric model shown above is a rugged, heavy-duty clamp, electrically operated for the tough jobs.

ADVANTAGES:

For The Owners:

Better stringer bead; better finish weld; better pipe line.

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Speed; stringer bead cut-out eliminated; economy; swabbing and alignment with one tool; less labor required.

Available for pipe sizes 12" through 36"
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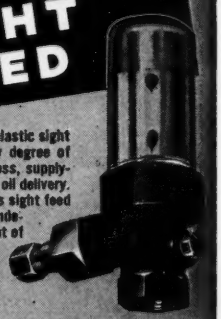

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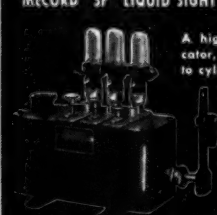

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The Central Committee on Radio Facilities of American Petroleum Institute has asked that all restrictions be removed from the proposed requirements on points of communications so that stations in the petroleum radio service would be permitted to communicate with all other stations in the petroleum service for transmission of essential communications in the same manner that stations in the railroad service are authorized to transmit to any other station in that service any communications essential to the operation and maintenance of railroads.

J. L. Cahill, president of the Pipe Liners Club of Tulsa, proposed at the meeting that the club prepare to affiliate with groups in other pipeline centers of the country in recognition of the widespread need for an adequate organization to be concerned with the technical advancements of the industry. The club was organized in September 1948 by pipe-line engineers and superintendents of the Tulsa area engaged in design, operation, construction and traffic activities in order to provide an opportunity for discussion of technical and operating problems.

Firms Seek Authority to Construct Gas Facilities

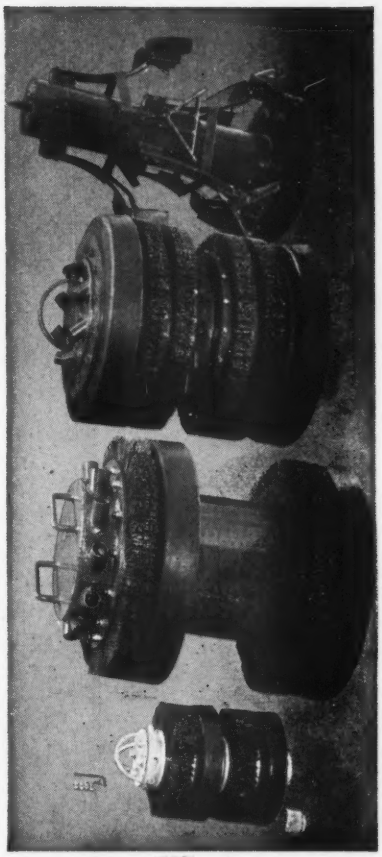
Federal Power Commission has been asked to authorize construction, retirement, and sale of natural-gas facilities in New York and New Jersey on systems of Home Gas Co., and Eastern Pipe Lines Co. in a joint application filed by the two firms, both subsidiares of Columbia Gas System, Inc. Cost of the entire project has been estimated at $2,447,994.

Home Gas Co. is seeking authorization to construct approximately 70 miles of pipe line in Orange, Sullivan, and Rockland counties, New York; to retire about 44 miles of pipe which forms an 11-mile transmission system in Orange County, and to sell approximately 10 miles of line in Cattaraugus County, New York, to Keystone Gas Co., Inc.

Eastern proposes to retire a pipeline system which extends 50 miles southeast through New Jersey from a point on the New York-New Jersey line in Sussex County to another point on the state line in Bergen County.

Ohio Fuel Asks FPC Permit

Ohio Fuel Gas Co., Columbus, subsidiary of Columbia Gas System, Inc., has asked Federal Power Commission to authorize construction of 85.5 miles of natural-gas transmission line in Central Ohio, to replace approximately 84 miles of line which the company proposes to retire. Estimated cost of the construction has been set at $4,167,000.



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- (2nd) **Type RN-1** Pig with 2 sets of rotation nozzles; by-pass gas purges brush bristles; brushes may be shimmed to compensate for wear.
- (3rd) **Type RCN-1** Pig with single row of rotation nozzles; new compact design for traversing long-radius factory ells. Light weight construction.
- (4th) Small size, **Type RCN-1** Pig, improved model will negotiate sharp bends; equipped with nozzle plugs for control of by-pass gas. Sizes 8" to 14". Type SCN-1 in sizes 3" to 6".

*Patents pending

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TYPE CC CENTER LATCH SAFETY LOCK ELEVATOR

AUTOMATIC SPRING OPENING—Automatically opens elevator when latch is opened—gives proper balance when open—throws elevator away from pipe when latch is opened.

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Among the Drilling Contractors

Evening Drilling Classes Provided in California

An opportunity to acquire added drilling knowledge is being provided for oil men in the Bakersfield, Calif., area through evening courses conducted at the Bakersfield Evening High School. Oil and oil services companies in the area are cooperating in the venture by providing competent instruction. The courses make use of movie and slides. Subjects offered are drilling practice, drilling mud control, and production practice. Edward Mohr, Baroid Sales Division, National Lead Co., is conducting the classes in drilling mud control, while W. F. Jones, Stansbury, Inc., is directing the sessions in drilling practice and production practice.

Carco Drilling Co. has contract for Sun Oil Co. 1 Dedman, a 5,100-ft. or Woodbine zone test in J. M. Musquiz Survey, Sacul area, Nacogdoches County, Texas.

Atlas Drilling Co. will drill Carter Oil Co. 3 Edward Steckler, a 2,150-ft. well in the Bethel sand, NE SE SW 13-1s-12w, Knox County, Indiana.

Lindley Drilling Co. will drill 1 Emjay Petroleums, a wildcat in LSD 3, 6-63-10w4, located about 90 miles northeast of Edmonton, Alta., Canada.

W. Henry Schooler, Big Lake, Tex., has contract for O. W. Killam 1 Patrick Brothers, a 4,000-ft. cable tool wildcat, 1,180 ft. from east and 1,340 ft. from north lines of Section 104, Block 2, I&GN Survey, in northwestern Val Verde County, Texas.

W. A. Weir Heads Canadian Division of Oilwell

W. A. Weir has been appointed assistant division manager for the Rocky Mountain Division of the Oil Well Supply Co. with headquarters in Calgary, Alta., Canada. Weir, who has been district manager for western Canada for the past 4 years, will be responsible for directing and coordinating the company's activities in Canada. He has been associated with Oil Well Supply for the past 20 years, and spent 8 of them in Canada. The move reflects an expansion of the company's Canadian operations.

Skeeters and Curry has contract and is rigging up at Coats & Danziger 1 H. L. Wickham, 15 miles southwest of Corsicana, Tex., on a 100-acre tract in the Samuel Benton Survey.

Kuykendall Drilling Co. has contract for F. B. Cline 2 Roscoe Peterson, SW NW in Section 30-9n-8w, in Sullivan County, Indiana.

Longhorn Drilling Co. will drill for Henderson Coquat et al A-1 W. W. and Sophie Goebel. The well will be a 10,000-ft. wildcat in Live Oak County, 4 miles northeast of Oakville, Tex., and 1½ miles north of Goebel field.

Crew of the Oscar Borge Drilling Co., Midland, Tex., on location at Magnolia Petroleum Co. 2 Carson in Eunice, N. M. They are: Gene McComic, Marice J. Smith, F. D. Battle, C. C. Hall, driller, D. W. Collins, service engineer for the International Derrick & Equipment Co.

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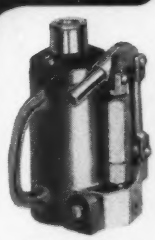

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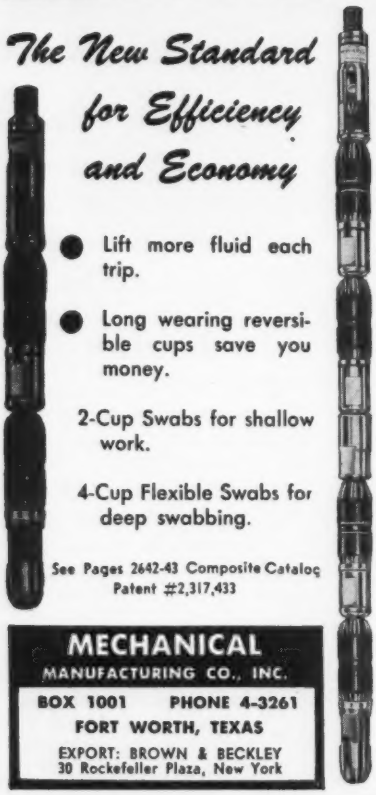

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2-Cup Swabs for shallow work.

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See Pages 2642-43 Composite Catalog
Patent #2,317,433

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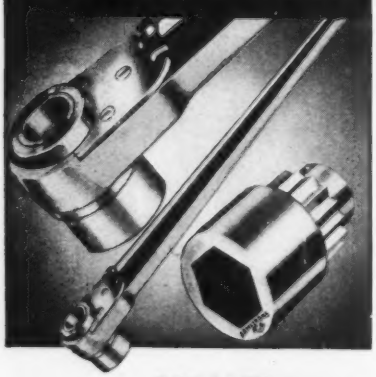
CONSTRUCTION TOOLS



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DROP FORGED
CONSTRUCTION RATCHETS

The ARMSTRONG Reversible Ratchet Construction Wrenches are made of steel thruout—the Ratchets are drop forged, the Nut Socket machined from special analysis bar steel. All parts except the handle are hardened. The spindle of the Ratchet is of "wide open" design—permits bolt to pass thru the Ratchet so that nuts can be run any distance along bolt and securely set with one setting. 24" or 36" Ratchets take square or hexagonal sockets for nuts of from 1" to 2 5/16" dia. or 1 1/4" to 3 1/4" dia., respectively.

Write for NEW S-43 Catalog just released.

ARMSTRONG BROS. TOOL CO.
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Wheless Drilling Co. Shreveport

WHELESS DRILLING CO., which operates in eastern Texas and all of Arkansas, Louisiana, and Mississippi, has headquarters at 214 Commercial Bank Building, Shreveport. N. Hobson Wheless is president of the company, N. H. Wheless, Jr., is vice president, and R. L. Berryman is secretary-treasurer.

N. H. WHELESS

History. — The company was organized in 1923 by N. H. Wheless and Aubrey F. Lanier as Sultana Drilling Co. It began operations with one drilling rig in the old Smackover field in Union County, Arkansas. Six years later, the company, then operating several rigs, became active in Hugoton gas field in Kansas. Later, equipment was moved to the East Texas area when that development got under way. After Lanier's death in 1936 his interests were purchased largely by N. H. Wheless and John R. Bedingfield, who became vice president of the company. Part of Bedingfield's interest was acquired by N. H. Wheless, Jr., who was named vice president and assumed supervision of all field operations.

Equipment.—The company has five power rigs capable of drilling from 6,000 to 15,000 ft., and seven rigs with drilling capacities from 9,000 to 15,000 ft.

Operations.—During the war Wheless expanded its operations by increasing the number and capacity of its drilling rigs. Last year the company drilled a total footage of 300,000 ft. Companies associated with Wheless operate about 50 oil and gas wells located in East Texas, South Arkansas, South Louisiana, and in Hugoton field, Kansas.

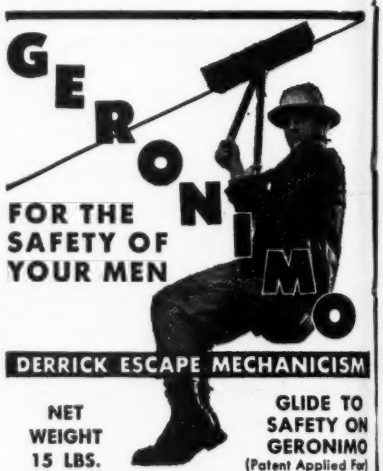
Personnel. — Besides those mentioned, other supervisory personnel includes the district superintendents, R. V. Pierce and D. A. Bahm. Tool pushers for Wheless are E. J. Bruce, L. D. Griffin, D. C. Chambers, Lloyd Burson, E. Deckard, W. H. Terry, Jack L. Taylor, E. D. Rhea, L. M. Rhea, V. R. Lay, and H. R. Haynes.

Tilley Drilling Co. is drilling Faultline Oil et al 1 Sasser et al, SW SW NW, 20-17n-3e, west of the Spoon pool, for depth of 4,300 ft. or the Bartlesville.

Viersen - Cochran Drilling Co. is drilling Superior Oil Co. of California 33-18 Cogdill in NW SE NW, 18-8n-11w, north of Fort Cobb, in Caddo County, Oklahoma.

Basin Oil Co. will drill D. C. Slusser 1 Leon S. and Helen I. Dysinger, SE SW NW, Section 21-17n-4w in Clare County, Mich.

Webb & White Drilling Co. is moving in rig for the Tulsa Iron & Metal Co. 1 O. B. Jackson, Ables Survey, Kaufman County, Texas.



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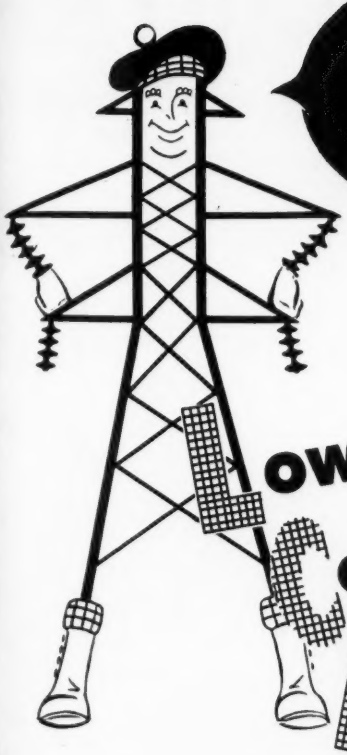

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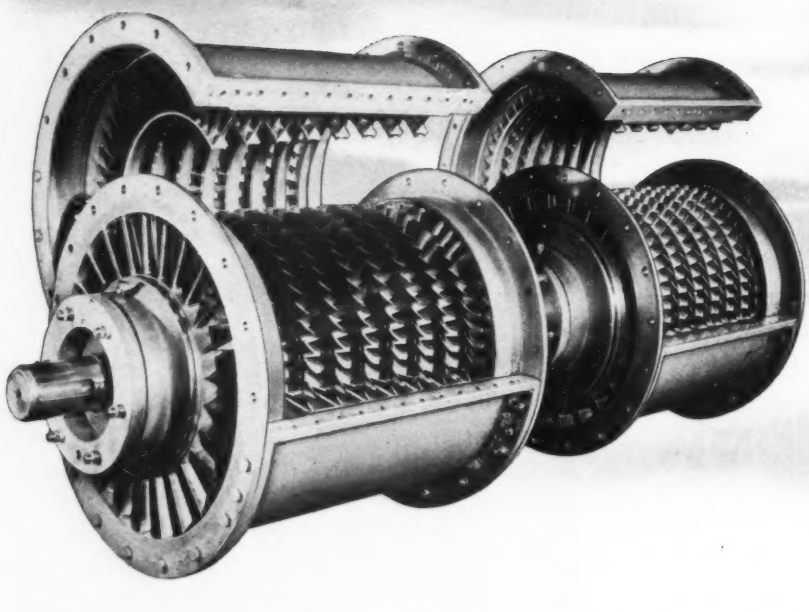

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NATURAL GAS

Supreme Court to Determine FPC Authority in Gas Case

WASHINGTON.—The Supreme Court this week agreed to determine if the Federal Power Commission acted within its authority in attempting to prevent Panhandle Eastern Pipeline Co. from transferring title to 96,000 acres of gas reserves in the Kansas section of the Hugoton gas field to the Hugoton Production Co.

The FPC lost two decisions in the District and Appellate Courts where it sought an injunction for enforcement of an order which Panhandle had ignored, and carried the case to the Supreme Court on the ground that disposition of properties by companies subject to FPC regulation in the manner followed by the company could lead to evasion of commission authority.

The commission also contended that a long-standing controversy between natural-gas companies and itself over whether rates should be based on the actual cost of gas or the prevailing market price was at issue.

Panhandle owns and operates a natural-gas pipe-line system originating in the Hugoton and Panhandle fields of Kansas, Oklahoma, and Texas. The system extends across Oklahoma, Kansas, Missouri, Illinois, Indiana, and Ohio, and into Michigan.

The firm decided to transfer gas-production leases on the 97,000 acres of its gas reserves in Kansas to Hugoton Production Co., which company Panhandle had organized under Delaware laws. Panhandle leases were transferred to Hugoton in exchange for Hugoton's entire capital stock. Hugoton later contracted to sell the gas to Kansas Power & Light Co.

FPC asked the U. S. District Court in Delaware to halt the transaction pending a commission study of the transfer, but the court refused the request and was upheld by U. S. Circuit Court in Philadelphia. The court said the commission had no authority in any circumstances over a natural-gas company's disposition of its gas reserves. FPC then asked a high court review.

Cities Service Challenges Natural-Gas Price Fixing

Constitutionality of a Kansas Corporation Commission order fixing the wellhead price of natural gas in the Hugoton field of Kansas has been challenged by Cities Service Gas Co., which filed a petition with U. S. District Court in Topeka. The firm asked the court to declare the order invalid, and also asked that law under which it was issued be voided.

In February the commission set a uniform wellhead minimum price of 8 cents per 1,000 cu. ft. of gas, effective on March 1. Prior to that date prices ranged from 3 to 8 cents in the Hugoton area.

Hugoton Gas Allowable Set For Next 6-Month Period

Due to field development and completion of pipe-line facilities, Kansas Corporation Commission has increased allowable of Hugoton gas field slightly for the period from April to September, as compared with allowables the same period a year ago.

The commission, at a recent hearing in Wichita, set the following allowables for the 6-month period, and comparative figures for the same months last year are also shown:

April, 16,221,000 M.c.f., compared to 14,275,523 M.c.f. in 1948; May, 16,242,500 M.c.f., compared with 14,087,284 M.c.f. a year ago; June, 15,641,000 M.c.f., compared with 13,281,297 M.c.f. in 1948; July, 15,757,500 M.c.f., compared with 13,285,283 M.c.f. the year previous; August, 15,867,500 M.c.f. against 13,436,160 M.c.f. in 1948; and 15,660,000 M.c.f. in September compared with 13,316,829 M.c.f. the same month a year ago.

This will total 95,395,500 M.c.f., compared with 81,632,376 M.c.f. the same 6-month period a year ago.

FPC Approval Asked in Gas Sale, Delivery Proposal

Federal Power Commission has been asked by Atlantic Seaboard Corp., Charleston, W. Va., for authorization to sell and deliver natural gas to Consolidated Gas Electric Light & Power Co., Baltimore, and to install measuring and regulating stations to measure the gas proposed for delivery to the Baltimore company.

The firm, a subsidiary of Columbia Gas System, Inc., recently received FPC authorization to construct additional facilities for the purpose of supplying increased requirements of its existing utility customers. At that time, however, the commission pointed out that Atlantic Seaboard could not meet the demands of the Baltimore company, and other new markets, without "excessive" curtailment of requirements of existing customers on the Columbia system. Deliveries therefore were authorized only to existing Columbia customers.

Atlantic Seaboard, in its new application to FPC, points out that the Baltimore firm has recently revised downward its previous estimates of the amounts of natural gas it will require through 1953. As a result, Atlantic Seaboard now believes that it can meet the needs of Consolidated without impairing service to its other customers, upon receipt of gas which it expects will be made available to the Columbia system by Tennessee Gas Transmission Co., Texas Eastern Transmission Corp., and Texas Gas Transmission Corp. Application says Atlantic Seaboard would construct not more than five measuring and regulating stations, at an estimated cost of $181,000. This project would be financed from funds on hand, the company said.

Court Reverses FPC Order In East Ohio Gas Case

United States Court of Appeals has reversed a Federal Power Commission order and has ruled that East Ohio Gas Co., Cleveland, is not a "natural-gas company" subject to the jurisdiction of the commission.

FPC had contended that the company is a "natural-gas company" in that it is engaged in the transportation of natural gas in interstate commerce because it receives gas transported by two other interstate companies, even though the gas is delivered within the state and is transmitted through some 650 miles of lines to various communities within the state where it is distributed to ultimate consumers.

East Ohio makes no sales to any other company for resale nor is any of the gas consumed outside Ohio. The company has been subject to complete regulation by the Ohio Commission, which had intervened in the FPC and Court of Appeals proceedings, along with the State of Ohio.

The Natural Gas Act defines interstate commerce, for the purposes of administration of the act, as "commerce between any point in a state and any point outside thereof, or between points within the same state but through any place outside thereof." It specifically excludes "any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas."

Meeting Scheduled April 28

Technical section of Pacific Coast Gas Association will be held April 28-29 in the Southern California Gas Co. auditorium, Los Angeles, and a number of technical papers pertinent to natural-gas and pipe-line activity will be given.

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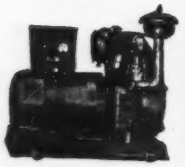

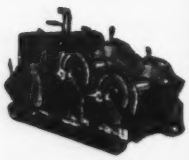

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REFINING

W.P.R.A. Members Told New Jet Fuel Given Wide Range

Members of the Western Petroleum Refiners Association were told last week that revised military specifications for the new JP-3 jet fuel will include approximately 55 per cent of the average domestic crude as compared with 6 per cent for JP-1, its predecessor. The basic specifications drawn up last year have been revised and approved, and will be released generally within a month.

The fuel, officially termed AN-F-58, and commonly called JP-3, will be procured as an aircraft turbine and jet-engine fuel for experimental and development purposes only. It includes components of gasoline, kerosine, and light distillate fractions. An interesting point is that natural gasolines can be included within the specifications. Liberalizing requirements will result in a slight loss in efficiency on a volume basis as compared with JP-1, but much greater potential availability will more than offset that loss.

Detail requirements expected to appear in the new fuel are as follows:

1. Freezing point.—The freezing point shall not be higher than —60° F.
2. Corrosion—("Air-Well" Copper Strip). There shall not be evidence of corrosion and not more than a slight discoloration of the copper strip when compared to a freshly polished copper strip.
3. Residue—The residue after evaporation by the air-jet method shall not be greater than 10.0 mg. per 100 ml. of fuel.
4. Aromatics.—The aromatic content of the fuel shall not exceed 25 per cent by volume.
5. Sulfur.—The sulfur content of the fuel shall not exceed 0.5 per cent by weight.
6. Specific gravity.—Specific gravity shall be limited to 45° to 63° A.P.I.
7. Reid vapor pressure.—The R.v.p. at 100° F. shall be at least 5.0 psi. but not more than 7.0 psi.
8. Water tolerance.—The fuel and water layers shall be clear and sharply defined and neither layer shall have changed in volume by more than 2 ml.
9. Gum.—The accelerated gum content shall not exceed 20.0 mg. per 100 ml. of fuel.
10. Distillation.—(a) The temperature at the 90 per cent evaporated point shall not be less than 400° F. and the end point shall not exceed 600° F. (b) The residue shall not exceed 1½ per cent. (c) The distillation loss shall not exceed 1½ per cent.
11. Viscosity.—No requirement.
12. Bromine number.—The bromine number of the fuel shall not exceed 30.0.
13. Inhibitors.—The following active inhibitors may be added separately or in combination to the fuel in total concentration not in excess of 1.0 lb. of inhibitor (not including weight of solvent) per 5,000 U. S. gallons of fuel in order to prevent the formation of gum: 2, 6-ditertiary butyl, 4-methyl phenol; N, N′ di-secondary-butyl-para-phenylenediamine and 2, 4, dimethyl-6-tertiary-butylphenol. These are represented by the commercial additives du Pont 22, Paranox 441, or Paradyne A and Shell 24 M6 B.
14. Heat of combustion.—The heat of combustion (lower or net value) of the fuel shall be not less than 18,400 B.t.u. per pound.

New du Pont Laboratory Is Now Operating in Houston

A new petroleum-chemicals laboratory has been opened in Houston by E. I. du Pont de Nemours & Co., Inc., which will serve oil refiners in Texas, Louisiana, and New Mexico, in connection with their use of tetraethyl lead and other petroleum chemicals marketed by the company.

Open house was held April 1, and a series of similar gatherings of oil men and refiners were held in Tulsa and Chicago recently, marking advent of du Pont as a direct marketer of tetraethyl lead antiknock compounds for gasoline. The firm has manufactured tetraethyl lead for more than 25 years.

California Standard Lets Contract for 6-In. Line

Standard Oil Co. of California has awarded contract to Alex Robertson Co. for construction of about 6 miles of 6-in. pipe from Montebello to connect with a system serving the company's refinery at El Segundo, Calif. Total cost of the project, which is scheduled for completion late in May, will be approximately $150,000, the company reported.

The line will carry natural gas from the Montebello field for use as fuel at the refinery. It will replace an existing line 30 years old, which is to be abandoned.

Production of Coal Tar Is Discussed in New Report

Production of coal tar by low-temperature methods in Germany, which helped to augment fast-dwindling German reserves of liquid fuels during the war, is described in a new report made public by the Bureau of Mines. Gasoline and oil can be extracted from coal tar by distillation, or by hydrogenation.

The publication, Information Circular 7490, is one of a series of reports on wartime Germany developments in the mining, preparation, and utilization of coal, and was prepared by E. O. Rhodes, manager of the development section, tar-products division.

Koppers Co., Inc., and a member of a solid-fuels mission to Germany.

Major production of low-temperature tars did not begin in that country until 1918 when the shortage of mineral oils became acute, the report discloses. Increasing demands for liquid fuels between 1933 and 1945 spurred development of a low-temperature coal-tar industry which, by 1943 was producing 658,250,000 gal., or about 154,670,000 gal. more than the long-established high-temperature coal-carbonization industry.

Two N.P.A. Groups Plan Joint Meeting April 15

A joint meeting of two departments of National Petroleum Association, standards and tests, and manufacture, will be held April 15 in Cleveland in conjunction with the forty-sixth semiannual meeting of N.P.A. The association meets at Hotel Cleveland April 13 through 15.

During the joint meeting of the two departments, H. C. Mougey, technical director, research-laboratories division, General Motors Corp., will discuss "Automobile Crankcase Oils," and Dr. Gustav Egloff, director of research, Universal Oil Products Co., will discuss "Modern Research in the Oil Industry." C. H. Van Hartesveldt, vice president, Thompson Vita-Meter Corp., will deliver a paper on "Anti-Detonant Injection and the Petroleum Industry."

New Antirust Gasoline Developed by Sinclair

A new fuel which is described as the "world's first antirust gasoline," has been developed by Sinclair Oil Corp. research laboratories.

The chemical known as RD-119 is blended with gasoline at the refinery and the company reports it thus not only stops rust in a motor car's gasoline tank and prevents formation of rust particles that clog the fuel system, but also stops rust at the refinery, in pipe lines, tank trucks, and dealers' storage tanks.

Sinclair will start a marketing campaign to introduce the new fuel in the near future.

Speakers Announced for Oil-Heat Institute Meet

Speakers announced for the twenty-sixth annual convention of Oil-Heat Institute of America, which will be held in Boston May 16-20, in conjunction with National Oil-Heat Exposition, will include Dr. W. C. Schroeder, chief, Office of Synthetic-Liquid Fuels, U. S. Bureau of Mines, and Dr. Courtney Brown, assistant head of coordination-economics department and head of petroleum-economics division, Standard Oil Co. (N.J.)

Meeting at the Statler Hotel, the group will convene on May 18 for the burning-oils industry session, during which time R. S. Bohn, president of O.H.I., will preside as chairman. Dr. Schroeder will speak on "Heating Oils from Petroleum, Coal, and Shale." Dr. Brown will address the group on "Burning Oils and the Future," on May 19.

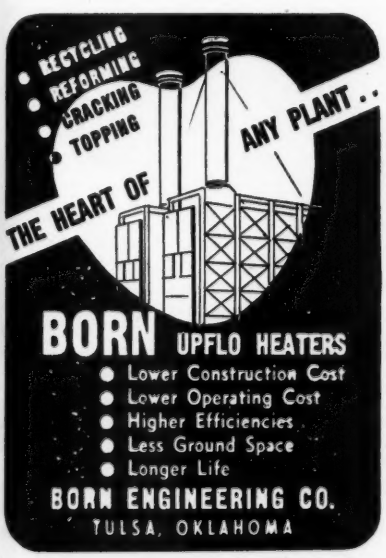
New Way Developed to Tell Pennsylvania-Grade Crude

New laboratory methods have been developed which will enable Pennsylvania Grade Crude Oil Association to determine whether a specific lubricating-oil sample is derived from a Pennsylvania or non-Pennsylvania crude-oil source, W. C. Wenzel, association executive manager, announced in Oil City, Pa., recently.

Wenzel reported that Dr. W. C. McCrone of Armour Research Foundation, Chicago, described the several methods in an article titled "Identification of Pennsylvania Oils," in a recent issue of "Producers Monthly."

Methods developed by the foundation makes use of scientific procedures called infrared transmission, bromine number, and refractivity intercept. They supplement one of the first methods used for the identification of Pennsylvania oils, based on optical rotation and development at Pennsylvania State College.

A device called an "infrared spectrometer" will detect color bands not registered on the human eye, and will measure the amount of light transmitted by different colors in the infrared, McCrone said. When Pennsylvania oil is examined with the spectrometer, strong absorbance is shown at 10.3 microns, although this characteristic is almost entirely absent in Mid-Continent oil.



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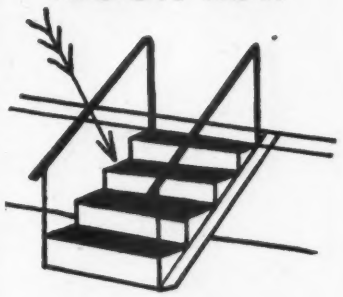

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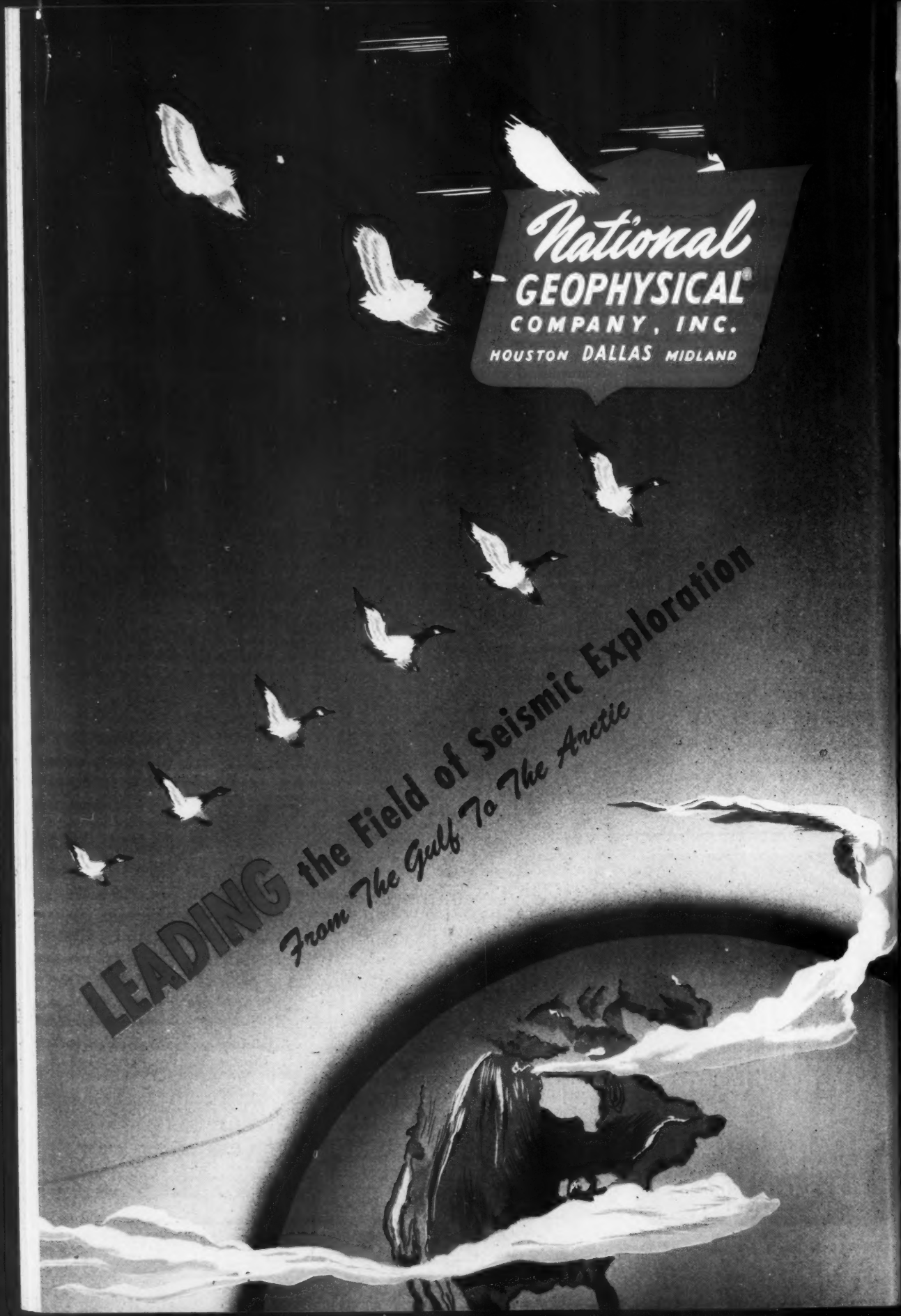
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Exploration and Drilling

Another Important Reef Strike for West Texas

A NEW Pennsylvanian limestone reef strike in southwestern Borden County, Texas, is adding fuel to the fire of interest in what appears to be widespread oil possibilities of that type on the east side of the Midland Black Shale basin.

Seaboard Oil Co. of Delaware and Pan American Production Co. 1 T. J. Good, southwestern Borden County, 1,985 ft. from south and 2,004 ft. from the west lines of Section 37, Block 33, T-4-N, TP Survey, on drill-stem test showed indications of being good for 22 bbl. per hour or better. The pay is being called Canyon lime, Pennsylvanian, and is said to be a reef phase of the lime.

It is about 6½ miles north of the nearest production in Vealmoor field in northern Howard County, producing from the same pay. Many geologists think that it is a north extension of the Vealmoor area, rather than a separate field. If this turns out to be a good guess, the field will be of substantial size, and might rival the current hot developments in Pennsylvanian lime reefs in Scurry County. Scurry County lies just east of Borden. *(For recent data on Scurry County, see The Oil and Gas Journal, March 10, 1949, page 135.)*

Practically every major company operating in West Texas on any substantial scale already has at least one research geologist combing the files and literature, checking logs, samples, etc., to develop a regional picture of limestone reef trends in this general area. Some of them are further along in their studies than others, having gotten an early jump, through hunch, prior conviction of the coming importance of reef trends, or for some other reason.

While their interpretation varies, as is to be expected at this stage, several of them have mapped rather widespread regional trends where they think reef development exists on a substantial scale. It is a reasonable assumption that if there have been any "dry" holes drilled in some of these spots that look intriguing, and these holes went through the Pennsylvanian, then something else is being done. That something else is a check to see whether the Pennsylvanian lime samples were checked with fluorescent light, or given anything but a casual inspection. It is now pretty generally conceded that reasonably careful operators have passed up such pays at times.

Grapevine reports in West Texas (reliability not guaranteed) have it that geophysics crews working in Borden County say it is "lousy with structures." This may not mean much, even if true, for reef structures are apt to call for a particular and careful technique to pick up properly. Unless these crews were working on a program specifically designed to pick up reef outlines, they may have something else. The something else might or might not pay off in the Ellenburger. Thus far there is nothing in sight to justify expectations of the type of big Ellenburger production like that found farther west on the Central Basin platform. If it is present on the east side in such big accumulations, it hasn't been discovered yet.

The pay in the new strike is from 7,910-40 ft., so far. The last test was at 7,920-40 ft., through a ½-in. bottom choke, tool open at top. Gas came to the top in 19 minutes, mud in 38 minutes, followed by flowing oil 1 minute later. In the next hour it flowed 22 bbl. of clean oil. The operators, Seaboard and Pan American, are preparing to run casing and complete the well.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Tests indicated a Phosphoria discovery at British-American Oil Producing Co.'s wildcat in the Clark Fork area, Carbon County, Montana, west of the Northwest Elk Basin field. Phillips Petroleum Co. recovered water on tests in the base of the Tensleep at the Golden Eagle, Wyoming, deep test, and the well will be completed as a new-pay oil discovery in the top of the Tensleep. Seaboard Oil Co. has abandoned the interesting Bitter Creek, Utah, wildcat at 8,520 ft., total depth, after finding noncommercial gas shows in Tertiary at around 8,100 ft.

WEST TEXAS.—Seaboard and Pan American Production Co. 1 Good, southwestern Borden County Pennsylvanian test, flowed 22 bbl. of oil in 1 hour on drill-stem test. Location of the new well is about 6 miles northwest of the Vealmoor field, which produces from approximately the same depth. In northern Borden County, Hunt Oil Co. 1-B Clayton & Johnson plugged back from the Pennsylvanian and completed for 40 bbl. of oil from the lower Permian. Field rumors on Sinclair's 1 Lips, Roberts County wildcat, credit it with flowing from 30-100 bbl. of oil a day from pay which was thought to be at 8,906-60 ft.

FLORIDA.—New oil production was opened in Florida this week at Humble Oil & Refining Co.'s B-2 Lee Tidewater Cypress Co., C SE NW 13-48s-29e. Drilled to a total depth of 11,585 ft., the well was completed flowing 519 bbl. of 26.4°-gravity oil per day.

LOUISIANA.—Shell Oil Co., Inc., announced plans to drill their No. 1 Weeks-Gall State Unit 1, on the Weeks Island Dome flank, Iberia Parish, to a depth of 15,600 ft. Offshore Plaquemines Parish, a crater under Shell Oil Co.'s blowout well in the Pass a Loutre area, has caused the loss of drilling rigs, barges and other equipment. Nothing is left at the site except gas eruptions under the water blowing out and burning with flames approximately 75 ft. high. Damage thus far is said to be in excess of $1,000,000. Operations will be resumed to shut off the well by drilling another directional hole into the crater.

XUM

TEXAS GULF COAST

Deepest Wharton County Producer Being Completed

HOUSTON. — The deepest producer for Wharton County is being completed at Federal Royalty Co. and R. A. Welch 3 Myra S. Pryor. This discovery is located in the William Robinson Survey, approximately 6 miles southeast of New Taiton. The hole was drilled to 10,834 ft. and the test is to be conducted through open hole from 10,820-34 ft. Operators have already made an initial test, which was closed in after a short duration, and the gravity of the condensate was reported to be 45.2° with flowing pressure on the tubing at 7,015 psi.

Superior Oil Co. has dual-completed the A-1 and A-2 Pryor wells in Altair field, Colorado County, in new pays, each producing through the tubing from the Upper Wilcox sands. The A-1 Pryor, located in BBB&C Survey, was reworked and completed through perforations from 8,194-8,208 ft. for a flow of 35 bbl. of condensate per day through a 14/64-in. choke. Flowing pressure on the tubing was 370 psi., gravity of fluid being 64.5°. The A-2 Pryor, located on the same lease, was completed through perforations from 8,187-99 ft. for a flow of 69.3 bbl. of condensate per day through a 14/64-in. choke. Flowing pressure on the tubing was 400 psi., making 55.2°-gravity condensate.

James G. McCarrick, Tr., 3 Ida A. Richey et al, is being completed for a new pay-zone discovery for Fort Merrill field of Live Oak County. This well is completing for an oil producer now from the Lower Pettus zone on dual completion with a gas completion from the 3,830-48-ft. level. It is located in the P. Salinas Survey. On drill-stem test at 4,496-4,520 ft., using ¼-in. chokes, recovered 1,300 ft. of fluid being 20 per cent oil, 80 per cent salt water, in 30 minutes, but test at 4,540-78 ft. recovered pipe-line oil, and the 5½-in. casing was set to 4,616 ft., with total depth of 4,620 ft., for the completion. The 3,830-48-ft. perforations flowed gas with 1,250 psi. working pressure through ¼-in. chokes, in 15 minutes, and the 4,562-76-ft. perforations flowed 70 bbl. of oil per day through a ⅛-in. choke, tubing pressure 500 psi.

The 51 new locations reported for Districts 2 and 3 included 17 wildcat starts, 4 in Brazoria, 3 in Jackson, and one each in Bee, Harris, Liberty, Live Oak, Madison, Montgomery, Polk, San Jacinto, Tyler, and Victoria counties. Two successful exploratory tests were completed, one each in Bee and Liberty counties, while 13 wildcats were dry, two each in Brazoria and Jackson and one each in Bee, Chambers, DeWitt, Fort Bend, Grimes, Montgomery, San Jacinto, Victoria, and Wilson counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Bee County: New gas discovery—P. R. Rutherford 2 Claude E. Heard, in Jeremiah Tool Sur., 11 mi. SE of Beeville, 7 mi. NE of Skidmore, TD 5,138 ft., top sand 3,474 ft., perf. 3,474-90 ft., IP: 5,200,000 cu. ft. gas per day on open flow (dry gas), WP 960 psi., on ¼-in. choke.

Liberty County: New gas-condensate pay, Hankamer—McCarthy O. & G. Corp. 1 E. W. Boyt, in H&TC Sur., Sec. 22, TD 8,058 ft., top sand 8,007 ft., Vicksburg, perf. 8,007-21 ft., IP: 7,736,000 cu. ft. gas, 26 bbl. condensate per day through ¼-in. choke, GOR 292,476 ft.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: H. R. Smith & W. C. McBride 1 A. J. Kimball, in S. Winship Sur., dry, TD 7,264 ft.

Brazoria County: J. S. Abercrombie and Magnolia Pet. Co. 1 E. D. Cooper, in S. F. Austin League, NE of Old Ocean production, dry, TD 11,450 ft.

Jack W. Frazier 2 Lillie O. Hurlock, in HT&B Sur., Sec. 55, 2 mi. SE of Iowa Colony townsite, dry, TD 9,715 ft.

Chambers County: McCarthy O. & G. Corp. 1 C. N. Stevens et al, in J. M. Duran League, 3 mi. N of Winnie, dry, TD 9,518 ft.

DeWitt County: Sun Oil Co. 1 Lena Alves, in Lena Alves Tract, Jose Santos Sur., dry, TD 7,690 ft.

Fort Bend County: Sun 1 Stancliff, in Elijah Alcorn Sur., Sugarland area, dry, TD 10,117 ft.

Grimes County: E. C. Scott-J. H. Pittman 1 Hadley Johnson, in A. D. Kennard Sur., 4 mi. W of Richards, dry, TD 1,004 ft.

Jackson County: F. A. Gillespie & Sons 1 A. Michalek, Sr., in C. W. Hahl Subd. of Hardwood-Burns ranch, in John J. Linn Sur., dry, TD 4,872 ft.

P. T. Sharples 1 Drushel et al, in Morris & Cummings Sur. 27, 10 mi. SE of Ganado, dry, TD 7,510 ft.

Montgomery County: J. W. Frazier 1 Bender Estate, Tr., in Montgomery County School Land Sur., 3 mi. NE of Spring, dry, TD 7,041 ft.

San Jacinto County: Starr O. & G. Co. 1 J. W. Thomason, in J. M. De La Garza League, 9 mi. E of Willis, dry, TD 6,013 ft.

Victoria County: Rock Hill Oil Co. 1 V. J. Schiller, in SA&MG Ry. Co., Sur., NE of Bloomington field, dry, TD 5,357 ft.

Wilson County: Mellie Pegg, Milton Pegg and W. H. Bode 1 Mike Lopez, in S & J Arocha Sur., 5 mi. N of Floresville, dry, TD 2,756 ft.

APPALACHIAN FIELD

Drilling Begins on Deep Wildcat in Ritchie County

PITTSBURGH. — Drilling operations have started in a new deep-test wildcat in Grant district, Ritchie County, West Virginia, by Davis-Kelly Oil Co. 1 Morello Jackson, elevation 634 ft. It is located on the Elizabeth quadrangle, 3¼ miles south of latitude 39°, 10′, 1.5 miles west of longitude 81°, 15′, on the waters of Hughes River. In this same district, Hope Natural Gas Co.'s deep test, 9,300 Jessie Powell, elevation 1,006 ft., reported the Corniferous lime at 5,460 ft. and drilling at 5,495 ft.

Location for a wildcat has been made in Steele district, Wood County, United Carbon Co. et al 1-1,633 P. E. Province et al, elevation 1,012 ft. It is located on the Belleville quadrangle 1¾ miles south of latitude 39°, 5′, 4¼ miles west of longitude 81°, 30′, on the waters of Pond Creek. In Kingwood district, Preston County, Hope Natural Gas Co. 9,209 Frank Barlow, elevation 2,235 ft., reported the Oriskany sand 8,249-8,323 ft. with drilling at 8,343 ft. In this same county, but in Portland district, William E. Snee 3 Sisler, elevation 2,036 ft., was deepened from 5,628 ft. and reached the Oriskany sand at a depth of 5,704 ft., with gas at 5,792-94 ft. testing 2,000,000 cu. ft., total depth 5,795 ft. A good gas well was brought in in Harts Creek district, Lincoln County, with United Fuel Gas Co. 4-6,442 fee, gaging 1,000,000 cu. ft. in the Salt sand and shale, total depth 4,285 ft.

Nine new locations reported in West Virginia were: Ravenwood district, Jackson County; Cabin Creek and Jefferson districts, Kanawha County; and in Poca district, Putnam County.

In Elder Township, Cambria County, Pennsylvania, Peoples Natural Gas Co. 1-3,831 Clearfield and Bituminous Coal Co., elevation 2,010 ft., was completed with gas testing 44,000 cu. ft., total depth 5,262 ft.

Three new locations were reported in Pennsylvania: Parks and Plumcreek townships, Armstrong County; and in Red Bank Township, Clarion County.

WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County: In Portland district, William E. Snee 3 Sisler, elev. 2,036 ft., (deepened from 5,628 ft.), 2,000,000 cu. ft. gas, Oriskany sand 5,704 ft., gas 5,792-94 ft, TD 5,795 ft.

PENNSYLVANIA SUCCESSFUL WILDCAT

Carbria County: In Elder Township, Peoples Natural Gas Co. 1-3,831 Clearfield and Bituminous Coal Co., elev. 2,010 ft., 44,000 cu. ft. gas at 3,205 ft., TD 5,262 ft.

MISSISSIPPI

Greene County Well Still Coring After Show of Oil

JACKSON.—Humble Oil & Refining Co. 1 F. J. Hubbard, 3-4n-8w, in Greene County, recovered 150 ft. of 26.6°-gravity oil and 540 ft. of oil-cut mud on drill-stem test from 7,798-7,804 ft., using ¼-in. bottom and ⅛-in. top chokes. Bottom-hole flowing pressure was only 50 psi. Operators cored ahead to 7,814 ft. with recovery being sand with show of oil. Another drill-stem test was run from 7,802-14 ft., using same chokes, and tool was open 35 minutes with a recovery of 30 ft. of 21.3°-gravity oil and 60 ft. of oil-cut mud. Coring was continued to 7,894 ft. with recovery being tight sandy shale with show of oil to 7,830 ft. and sandy shale with no show to 7,894 ft.

On the present north side of Yellow Creek field, Wayne County, Humble 1 Alice West-Masonite Corp., et al, 13-9n-8w, drilled to total depth of 5,116 ft. This test cut a fault with approximately 350 ft. of displacement at 4,400 ft. in the chalk section. No cores or sidewall samples were taken but the electric log showed 10 ft. of oil sand in the Morrison at 4,888-98 ft., 18 ft. of net oil sand in the City Bank at 4,954-94 ft., and 50 ft. net oil sand in the Stanley at 5,038-5,116 ft. This is a total of 78 ft. of net oil sand. Operators perforated casing opposite Stanley sand from 5,082-5,104 ft. and are preparing to test.

In LaGrange field, Adams County, Sohio-Roeser & Pendleton D-2 E. M. Baker, 34-6n-2w, has been completed pumping 112 bbl. per day, perforations at 6,175-81 ft. Total depth is 6.191 ft., top Wilcox 4,310 ft., top Baker 6,155 ft., Wilson 6,178 ft.

The California Co. 6 Board of Supervisors, 16-6n-8e, in Mallalieu field, Lincoln County, was completed on pump for initial production gage of 48 bbl. of 38°-gravity oil per day, perforations at 10,488-98 ft. Total depth is 10,581 ft. Top Marine Tuscaloosa 10,185 ft., Lower Tuscaloosa 10,368 ft., oil sand 10,488-99 ft.

Three wildcat starts, one each in Forrest, Jones, and Madison counties, and three development locations, one each in Bude, Tinsley and Yellow Creek fields, were reported this week. Four wildcats were dry, one each in Forrest, Itawamba, Rankin, and Walthall counties.

MISSISSIPPI WILDCAT FAILURES

Forrest County: Humble O. & R. Co. 1 J. A. Griffin, 4-4n-12w, dry, TD 9,417 ft. Top Marine Tuscaloosa 8,400 ft., Lower Tuscaloosa 8,610 ft., Massive 8,954 ft., Lower Cretaceous 9,060 ft.

Itawamba County: Magnolia Pet. Co. 1 R. L. Burdine, 16-11s-9e, dry, TD 2,600 ft. Top Tuscumbia 1,803 ft., Camden Chert 1,978 ft., Poss. Silurian 2,560 ft.

Rankin County: Shell Oil Co. 1 Lula H Muse, 9-5n-2e, dry, TD 4,255 ft.

Walthall County: Sells Petroleum Co. 1 T. L. Wood, 17-1n-11e, dry, TD 10,649 ft. Top Marine Tuscaloosa 9,784 ft., Lower Tuscaloosa 10,123 ft., Massive 10,503 ft., Lower Cretaceous 10,503 ft.

FLORIDA SUCCESSFUL WILDCAT

Collier County: New oil discovery—Humble Oil & Refg. Co. B-2 Lee Tidewater Cypress Co., Center SE NW 13-48s-29e, TD 11,585 ft., set 5½-in. casing at 11,557 ft., IP: flowed 519 bbl. of 26.4°-gravity oil per day through a ¼-in. choke, TP 370 psi., CP 270 psi.

CANADIAN FIELDS

Golden Spike Confirms Thick Devonian Reef

CALGARY.—The Golden Spike discovery well, Imperial-Schoepp 1, LSD 9, 22-51-27w4, finally confirmed the water line after penetrating 518 ft. of Devonian coral reef limestone, nearly 3½ times the oil-bearing thickness of the best previous Devonian oil reef in Canada. On drill-stem test of interval 5,861-81 ft., Schoepp flowed around 250,000,000 cu. ft. of gas daily, with oil flow reaching the surface in about 1 hour. When pipe was pulled, about 2,900 ft. of oil and 60 ft. of salt water were recovered, to finally establish the water line at present bottom. The reef was topped at 5,363 ft. Coring and testing will probably continue for a while to gain further information on the water table, then the well will plug back and complete for steady production. Imperial's famous Golden Spike discovery well will likely be one of the best oil wells yet found in Canada when placed on steady production.

Imperial has started work on two step-outs, one nearly 3 miles northeast of the Golden Spike discovery well, the other about 3½ miles northwest. Imperial-Golden Spike 2 has started on LSD 3, 1-52-27w, 2½ miles north and 1½ miles east of Imperial Schoepp 1. The well was spudded and is running surface casing. Imperial-Golden Spike 3 was started on LSD 3, 5-52-27w, 4 miles due west of No. 2, and 2½ miles north and 2½ miles west of the discovery well. No. 3 has completed rigging and is ready to spud.

The Superior-Joseph Lake discovery well is now on experimental production runs with flow of light crude oil better than 100 bbl. daily through a 10/64-in. choke. Gas-oil ratio is only about 300 cu. ft. per barrel. Tightly choked back, the well is producing with 690 psi. on casing, 350 psi. on tubing and 75 psi. on separator. Flow will be maintained at the lowest possible efficient rate for at least a month to determine reservoir characteristics and performance ability. Interest in the well is owned 50 per cent by Imperial Oil, 15 per cent by General Petroleums, 12½ per cent each by Superior Oils and Kroy Oils, and 10 per cent by Jupiter Oils.

British Columbia Recoveries, a private company backed mainly by Vancouver interests, has encounterd oil in the D2 zone of Devonian at its initial southwest Leduc stepout venture. The B. C. Recoveries 1 indicated commercial production after 1 hour drill-stem test from 5,233-51 ft. gave a flow of gas to the surface 8 minutes after tester was opened, reaching a maximum of 200,000 cu. ft. daily plus a pipe recovery of 630 ft. of oil and 210 ft. of oil-cut mud.

The possibility of this well extending Leduc field to the southwest looks very favorable. Further coring and testing at 10 to 15 ft. intervals is being carried out to definitely determine the potentialities of this interesting test. On later D2 tests, gas but no oil or water has shown so far. D2 zone has been fully penetrated, and the well is now drilling in the green shale at 5,333 ft. in search of D3. If and when D3 is encountered, careful coring and testing will continue to determine possibilities of D3. If D3 production is not indicated, the hole will be plugged back to D2 for production tests. The well, in LSD 16, 31-49-26w, is on a quarter section located about 1½ miles southwest of the main Leduc field, the same distance west of Okalta Oils' south Leduc pool, and the same distance southeast of B.A.-Leduc Leaseholds D2 zone West Leduc successes.

Imperial Oil, Ltd.'s Bon Accord 1 indicated D2 Devonian zone oil discovery about 18 miles north of Edmonton, was swabbed into production and commenced flowing by heads through flare line. Imperial reports that current output consisted of a fair amount of crude oil plus about a 17 per cent cut of salt water. The well, in LSD 1.

CARTER CARTER CARTER

29-56-23w4, completed at total depth 4,630 ft., is continuing to test.

Wildcat abandonments.—Bear-Westmount 1, LSD 14, 9-86-7w4, in the Athabaska River region, total depth 1,793 ft.

Stanolind-Calling Lake 1, LSD 3, 21-71-22w4, total depth 2,868 ft.

Stanolind-Perryvale 1, LSD 14, 11-63-23w4, total depth 4,043 ft.

Midland Petroleums 1, LSD 11, 23-52-27w4, total depth 6,050 ft.

Clancey-Imperial-Sylvan Glen 1, LSD 1, 18-31-3w5, total depth 4,229 ft.

New wildcat locations.—Royalite-Crowfoot 3, LSD 2, 9-20-19w4.

Royalite-Peavey 1, LSD 5, 29-56-25w4.

Barnsdall - Honolulu - Seaboard-Willson 1, LSD 14, 6-17-25w4.

Spruce Grove 1 (Shaw), LSD 4, 11-33-27w4.

EASTERN TEXAS

Humble Drilling Ahead After Wildcat Shows Gas

DALLAS. — Unofficial information on Humble Oil & Refining Co.'s Nacogdoches County wildcat, 3 miles northwest of Tarwick, reported a flow of gas rated around 2,500,000 cu. ft. daily on a drill-stem test of the Rodessa from 6,728-6,801 ft. The test was open 31 minutes, with packer at 6,731 ft. One-quarter inch top and bottom chokes were used. Maximum surface flowing pressure was 1,800 psi. Recovery was not reported.

Additional gas show was reported in a core from 6,802-6,934 ft., with no shows in cores from 7,224-7,311 ft.; then porous limestone from 7,440-7,515 ft. having gas odor in the bottom 18 ft. Operators were drilling ahead below 7,550 ft. It was believed to be in the Pettit lime.

Placid Oil Co.'s 9,000-ft. Cotton Valley wildcat, the 1 J. T. & L. C. Winston, Wm. D. Perry Survey, 3¼ miles northeast of Lotta in Harrison County, cored lime with light to good odor, and some saturation, from 4,658-98 ft. It was reaming at 5,718 ft. at last report. Top of the Massive anhydrite was logged at 4,490 ft. Elevation is 290 ft.

General Crude Oil Co. 1 Shelly L. Smith, 1¾-mile west and slightly north of Melvern, in Leon County, was drilling ahead at 4,660 ft. in shale.

Humble Oil & Refining Co. 1 Thurman Crawford, Nacogdoches County wildcat, had total depth at 7,705 ft. in shale and lime and prepared to drill ahead. A core from 7,655-7,705 ft. had shale and lime, with streaks of fair to good gas odors.

In Panola County, Dr. E. O. Rushing 1 fee, Joaquin field outpost, had total depth at 6,150 ft. in lime and shale, and operators were preparing to run casing. The Hill section was said to carry salt water, but a test of the Pettit had a surface pressure of around 600 psi. Operators were withholding official information. Location is in the Mannan Smith Survey, A-592.

P. H. Pewitt 1-F Pickering, H. A. Reed Survey, A-598, on the southeast edge of Joaquin field, in Shelby County, had total depth at 6,168 ft. Operators prepared to complete dually in the Hill and Pettit sections. Perforations in the Hill were from 4,908-16 ft., and in the Pettit at 5,966-92 ft. Tests had not been made after acidizing.

EAST TEXAS (DISTRICTS 5 & 6) SUCCESSFUL WILDCAT

Smith County: Humble Oil & Refining Co. 1 Everett Wintters, Wm. Price Sur., 8 mi. NW Winona, Rodessa perforations 9,368-74, 9,378-9,494 ft., flowed 216 bbl. 44°-gravity oil in 16 hr., ¼-in. choke, IP 320½ bbl. oil a day, TP 500 psi., GOR 885 cu. ft., TD 10,409 ft., PB 9,570 ft., elev. 527 ft.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURE

Anderson County: Broseco Corp. 1 W. J. Melton, Jessie Gibson Sur., 10 mi. SE Palestine, dry, TD 6,003 ft., Pecan 4,567-5,011 ft., Austin 5,518-5,722 ft., sub-Clarksville 5,800 ft., elev. 410 ft.

CALIFORNIA

Guijarral Hills Field Importance Is Increased

LOS ANGELES.—The latest completion in the new Guijarral Hills field of Fresno County emphasizes the importance of this oil discovery. Barnsdall Oil Co.'s 22-2-6 Dessel, 2-21s-16e, is flowing 1,400 bbl. a day of 37.8°-gravity oil through a 20/64-in. choke, making it one of the best wells brought in in California in several years, considering the size of the opening. Pressure on the tubing is 980 psi. and on the casing 450 psi. Gas-oil ratio is 428 to 1. Some of the early completions in the big Russell Ranch field produced more than this but through a larger choke. The Barnsdall well is producing from the Leda sand at approximately 8,900 ft. A recent Standard Oil Co. of California completion cored over 200 ft. of oil sand in the Leda. Discovery of a second sand, lying above the Leda, has just been made by Barnsdall Oil Co. in its 73-34-2 Allison, 34-20s-16e, thus adding to the field's potentialities. Size of the new pool discovery well will not be known until its completion, probably next week, but on a short test it produced 37°-gravity oil at a 1,000-bbl.-a-day rate.

W. R. Gerard has brought in 1 Cairns-Gerard for what may be the discovery well of a new heavy-oil field in the Dyer Creek area of Kern County. The well, located in Section 11-26s-27e, is producing 100 bbl. a day of 16.2°-gravity oil, 4 per cent cut, from 2,305 ft. The new find which topped the Vedder at 2,285 ft., is 1,200 ft. southeast of a discovery made in 1941 by Shell Oil Co. in its 56-X-11 Smith which made 185 bbl. of oil and 25 bbl. of water on completion. This project was abandoned in 1944, however, and the new Gerard well is presently the only producer. Gerard's next location will be staked in a southeasterly direction and should it, too, be successful, this week's completion will likely be classed as a new fault-trap discovery against the Dyer Creek fault.

Oil possibilities of the southeastern end of the Cuyama Valley were further clarified this week with the abandonment by Richfield Oil Corp. of its 1 Wegis-Reyes in Section 9-9n-25w, about 15 miles southeast of Russell Ranch production; total depth 6,049 ft. This failure followed the abandonment a week ago of Humble Oil & Refining Co.'s 1 Eugene Wegis et al, 28-9n-25w, 3 miles to the south. Only important wildcat now at this end of the valley is Richfield's 1 Perkins, 27-10n-26w, a deep test which is reported to have had oil showings below 10,000 ft. These showings will soon be tested. In the meanwhile, Richfield is preparing to drill another wildcat, the 1 Homan, about 5 miles west of the Perkins well in 35-10n-27w. A failure to the west of Russell Ranch production also occurred this week with the abandonment of Eagle Oil & Refining Co.'s test in 26-11n-29w, This is about 7½ miles west of the White Rock area of Russell Ranch field. The Eagle well was bottomed at 5,325 ft. in Cretaceous.

Campbell pool production in San Ardo field of Monterey County has been extended about ½ mile to the west by the completion of The Texas Co.'s 1 Dudley, 3-23s-10e, for about 100 bbl. a day of 12.5°-gravity oil from 2,057 ft. Production in the Campbell pool has been extended to the west, the northwest, and the northeast in the last month. Jergins Oil Co. and North American Oil Consolidated will now attempt to extend it to the east and have made a location for a joint test, 18-18 Hamby, in 18-23s-11e. These operators last week abandoned their 1 Glau test in 19-22s-19e, 1 mile west of the town of San Ardo, at 2,452 ft. in basement complex.

McCarthy Oil & Gas Corp. has made a location for 88-5 Pollizzotto-Cousins, 5-31s-20e, a rank wildcat in the Soda Lake area of San Luis Obispo County.

CALIFORNIA WILDCAT FAILURES

Kern County, Tejon area: Hoyet Greenwood 1 Tejon - Greenwood, 23-11n-18w, dry, elev. 975 ft., TD 1,875 ft.

Tejon area: T. and E. Drilling Co. 2 T. & E., 14-11n-18w, dry, elev. 1,160 ft., TD 1,030 ft.

Monterey County, Peachtree Bow area: The Texas Co. 2 Bingaman, 26-20s-11e, dry, elev. 1,759 ft., TD 2,300 ft.

Solano County, Vacaville area: Amerada Petroleum Corp. 21-31 West, 31-7n-1w, dry, elev. 394 ft., TD 3,802 ft.

Santa Barbara County, Cuyama Valley area: Humble Oil & Refining Co. 1 Eugene N. Wegis et al, 28-9n-25w, dry, elev. 2,921 ft., top Cretaceous 1,025 ft., TD 2,501 ft.

Carpinteria area: Thornbury Drilling Co. 3 Community, 34-4n-25w, dry, elev. 60 ft., TD 1,807 ft.

Los Angeles County, Whittier area: Standard Oil Co. of California 1 Rowland Estate, 21-2s-10w, dry, elev. 647 ft., TD 4,340 ft.

SOUTH LOUISIANA

New Field Opened South Of Timbalier Island

NEW ORLEANS.—Humble Oil & Refining Co. has opened a new oil field off the Louisiana coast in the Gulf of Mexico. The discovery, 1 South Timbalier, State Lease Account 1, in Tract 1176, Block 34, being 10 miles south of Timbalier Island, and 12 miles south of Caillou production, is flowing at the rate of 19 bbl. of pipe-line oil per hour. The test was drilled to 9,926 ft. and 9⅝-in. casing cemented to 9,919 ft. The casing was perforated from 9,950-58 ft. and on a 2-hour gage, the well flowed 19 bbl. per hour or at the rate of 456 bbl. of 39.6°-gravity oil per day through a 3/16-in. choke. Gas-oil ratio 593. No water in the flow.

Tide Water Associated Oil Co. is attempting to move off the location of its discovery oil well in the Manila Villege area of Jefferson Parish. The wildcat strike, 1 State Lease 1299, located in Section 35-18s-24e, 25 miles south of New Orleans, was drilled to a total depth of 13,007 ft., with 9⅝-in. casing cemented to 8,973 ft., 7-in. to 12,475 ft., and a liner from this point to 12,985 ft. Completion was made through open hole from 12,985-13,007 ft. During the early stages of the initial test, the tubing pressure was above 8,000 psi. flowing oil. After stabilizing, the tubing pressure was at 7,900 psi. The last test conducted was 166 bbl. of 40°-gravity oil per day through a 6/64-in. choke. Gas-oil ratio 5,300, showing a very small amount of mud.

The Hurricane Creek field of Beauregard Parish has been extended southwesterly by W. E. Walker 1 W. E. Walker fee, in 33-5s-8w. Drilled to a total depth of 8,630 ft., the pay was topped at 8,375 ft., and 5½-in. casing was cemented to 8,510 ft. On potential test the well flowed 108 bbl. of 47°-gravity oil per day through a 9/64-in. choke with flowing pressure on the tubing at 1,100 psi.

Gulf Refining Co. 1-C T. S. Stegall et al, in the north extension area of the Edgerly dome in Calcasieu Parish, has been completed as a new oil producer. Total depth is 8,956 ft. Through a 3/16-in. choke, the well flowed 160 bbl. of 37.7°-gravity oil per day with flowing pressure on the tubing at 2,250 psi. Production is through perforations at 8,818-26 ft.

The 12 new locations reported this week included one wildcat start in Calcasieu Parish. Only one wildcat failure was reported this week; it is in Jefferson Parish.

LOUISIANA WILDCAT FAILURE

Jefferson Parish: Gulf A-2 Louisiana Ld.

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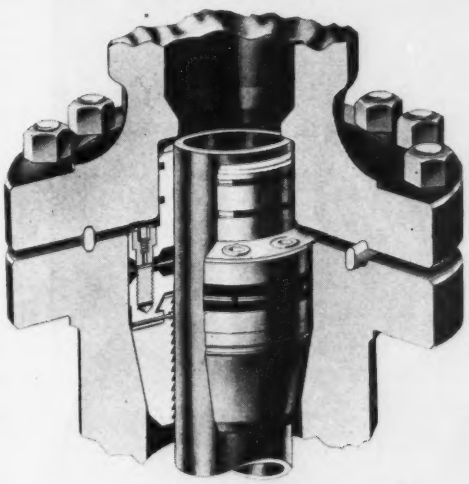
The CAMERONHEAD with Type KTX Hanger, illustrated at right, provides slip suspension and a pre-tested resilient seal. One of the packing cap screws is provided with a pressure test port, and the seal ring is so designed that test pressure may be applied to both its inner and outer surfaces.



TYPE KTX

Note that seal rings are provided on the cross-over gland to serve a two-fold purpose: pressure is confined to the bore of the tubing head, and corrosive fluids or gases are excluded from the metal ring gasket.

As illustrated below (KTXM), a pre-tested, repackable, plastic seal can be furnished in the lower flange of the tubing head, or spool, with a cross-over gland adapted for the auxiliary seal. The cross-over gland is also furnished for a welded seal and with provision for pressure testing (NTXW). The simplest types of hangers are shown below as Types BX and KT.

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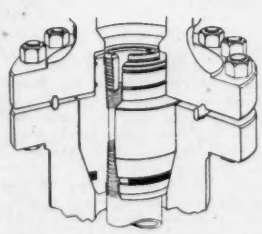
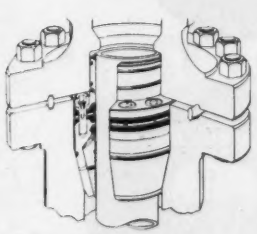


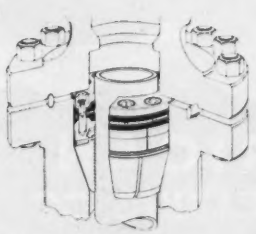
TYPE BX

Regular Boll-Weevil Hanger with auxiliary seal on cross-over.



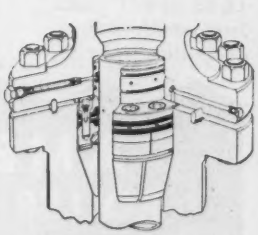
TYPE NTXW

Slip suspension, temporary seal on hanger for landing thru preventers, tested primary seal, and cross-over gland provisioned for test-weld.



TYPE KT

Slip suspension with pre-tested resilient seal.



TYPE KTXM

Slip suspension, pre-tested resilient seal and pre-tested, repackable, plastic seal on cross-over gland.

& Expl. Co., in Little Lake area, 32-17s-23e, dry, TD 10,135 ft.

SOUTHWEST TEXAS

Gas-Condensate Discovery Made Near Saxet Field

CORPUS CHRISTI.—Shell Oil Co., Inc., 1 Bevly, new gas-condensate discovery well in Nueces County, 3 miles south of Clarkwood, has been gaged at an estimated 100 bbl. of condensate and 6 bbl. of mud per day with 3,700,000 cu. ft. of gas, through a 3/8-in. choke, with 1,200 psi. tubing pressure, 1,500 psi. casing pressure, from the open hole at 9,914-48 ft. Total depth is 11,004 ft. The 7-in. casing was set to 9,914 ft. This new discovery is located in Wm. J. Cody Survey, south of Saxet field.

Also in Nueces County, Union Sulphur Co., Inc., 1 James A. Hill, Jr., is opening new oil production in what is known as the South Violet area, 3½ miles south of Violet. Drilled to a total depth of 9,519 ft., the well flowed at the rate of 2 bbl. of 48.8°-gravity oil per hour on a 5½-hour drill-stem test through ¼-in. chokes, through perforations at 6,369-71 ft. This well is located in BS&F Survey 162.

Amerada Petroleum Corp. 1 Concepcion Garza Zamora, wildcat discovery well in northeastern Brooks County, has been gaged at 1,787,115 cu. ft. of gas per day through ¼-in. choke, with gas-condensate ratio of 35,742, making 52.7°-gravity condensate with 1,650 psi. tubing pressure, casing sealed. Production is through perforations at 7,352-56 ft., shut-in pressure 2,530 psi. This well is in H. Brooks Subdivision of Loma Blanca Grant, 3 miles northeast of Falfurrias.

J. W. Gorman and W. A. Richardson et al and Ralph Rowden 1 Worden & Drought, a new gas discovery well approximately 2¼ miles northwest of Charamousca field, in Duval County, has been gaged at an estimated 27,000,000 cu. ft. of gas per day on open flow. Total depth is 2,231 ft., with 5½-in. casing set to 1,869 ft. Casing was perforated at 1,832-50 ft.

A total of 47 new locations were reported for Districts 1 and 4, of which 16 are wildcat starts, 3 each in Duval and Travis, 2 in Webb, and 1 each in Bastrop, Brooks, Jim Hogg, LaSalle, Starr, Val Verde, Williamson, and Zapata counties. Four successful exploratory tests were completed, two in Duval and one each in Hidalgo and Travis counties, while 16 were dry, 4 in Edwards, 2 each in Starr and Webb, and 1 each in Caldwell, Duval, Frio, Guadalupe, Kinney, Kleberg, La Salle and Nueces counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4)
SUCCESSFUL WILDCATS

Duval County: New gas pool—J. W. Gorman et al Worden-Drought, in Juan L. Saen Sur. 154, ¾ mi. NW of Charamousca-Wilcox discovery well, 12 mi. NW of Freer, top pay 1,778 ft., TD 2,231 ft., perf. 1,832-50 ft., IP: 27,000,000 cu. ft. gas per day on open flow, shut-in pressure 760 psi., no water.

New gas pool—M. L. Massingill & American Republics Corp. 1-A Brigidia Garcia et al, in Sur. 412, 1 mi. SW of Chiltipin field, 9 mi. N-NW of San Diego, TD 4,995 ft., in original hole, TD 3,330 ft. in sidetracked hole, top pay 3,260 ft., perf. 3,268-76 ft., IP: 1,750,000 cu. ft. gas per day on open flow, shut-in pressure 1,350 psi.

Hidalgo County: New gas discovery, Arrowhead area—Sun Oil Co. 1 F. R. Barrera, in San Jose Grant, and El Benadito Grant, 27 mi. NW of Mission, 1 mi. NE of Arrowhead field, TD 6,205 ft., perf. 4,630-38 ft., IP: 4,800,000 cu. ft. gas per day on open flow, shut-in pressure 1,815 psi.

Travis County: New oil pool "Lund"—Anderson-Prichard Oil Corp. 1 G. E. Johnson, in Pedro Rodriguez Sur., 6 mi. NW of Elgin, TD 1,009 ft., top sand 987 ft., plugged-back total depth 996 ft., IP: 40 bbl. oil per day 34° gravity, from open hole 982-996 ft.

SOUTHWEST TEXAS (DISTRICTS 1 & 4)
WILDCAT FAILURES

Caldwell County: Paul Voss Drilling Co. 1 M. W. Eppright, in Gideon Pace Sur., 2 mi. NE of Lytton Springs field, dry, TD 1,886 ft., top chalk 1,559 ft.

Duval County: M. L. Massingill & American Republics Corp. 2 Brigidia Garcia, in AB&M Sur. 412, 1 mi. W of Chiltipin field, dry, TD 4,962 ft.

Edwards County: H. M. Naylor Oil Co. 1 Lloyd Mitchell, in HE&WT Sur., Block E, 21 mi. NE of Rock Springs, dry, TD 7,811 ft. Top Marble Falls 4,707 ft., top Ellenburger 4,738 ft.

H. M. Naylor Oil Co. A1 Lloyd Mitchell, in Sec. 89, HE&WT Sur., Blk. E, dry, TD 500 ft.

H. M. Naylor Oil Co. 3 Lloyd Mitchell, Sec. 14, HE&WT Sur., Blk. F, dry, TD 1,452 ft.

H. M. Naylor Oil Co. A-1 Lloyd Mitchell, Sec. 87, HE&WT Sur., Block E, dry, TD 1,045 ft.

Frio County: Humble 1 Marrs McLean fee, in BBB&C RR Sur. 1082, dry, TD 6,830 ft.

Guadalupe County: Wiegand Bros. Drlg. Co. 2 J. M. Pearman et al, in Luling area, Robert Hall Sur., 6 mi. NE of Kingsbury, dry, TD 2,317 ft., top chalk 1,888 ft., top Eagleford 2,144 ft., top Georgetown 2,215 ft.

Kinney County: Phillips Pet. Co. 1 Louis (Hobbs ranch), in HE&WT RR Sur., 557, 2 mi. SW of Spofford, dry, TD 4,750 ft.

Kleberg County: Geo. W. Graham 1 Theo. Wm. & Walter Koch, in Theo. F. Koch First Subd. of Riviera Lands, 8 mi. fr. Riviera, dry, TD 8,535 ft.

LaSalle County: Ray Clark 1 Louis Yeager,

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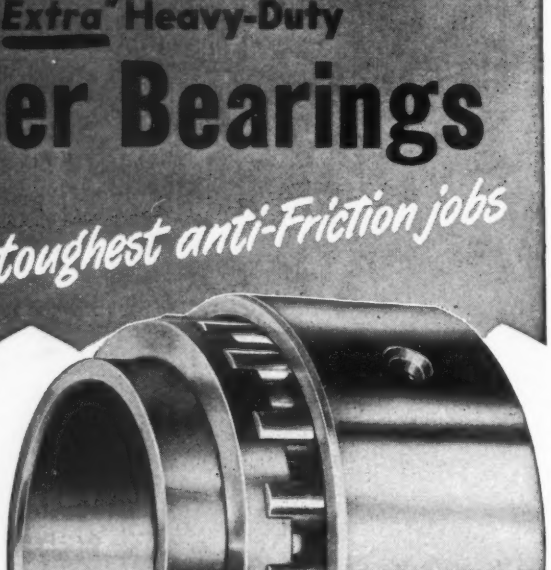

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Sec. 9, Wallace Subd., Henry Sikes Sur. 110, A-653, dry, TD 1,770 ft.

Nueces County: Lloyd H. Smith & Co. 1 H. P. Stevenson, in Tr. 12, Geo. H. Paul, 2 mi. W of Robstown, dry, TD 8,311 ft.

Starr County: A. & T. Drilling Co. A-2 P. S. de Ramaga (Renaga) in Sur. 72, 25 mi. N of Roma, dry, TD 1,137 ft.

Hickok & Reynolds, Inc., 1 Romona Salinas de Mendoza, in Sur. 300, Tr. 8, Jose Salinas Partition, 20 mi. N of Roma, dry, TD 1,615 ft.

Webb County: Dulaney Oil Co. 3 John W. Ward et al, in Jose Borrego Grant, 13 mi. S of Mirando City, dry, TD 1,471 ft.

Killam, Daubert & Achning 1 S. Vasquez, in Sur. 134, 2 mi. W of Bruni, dry, TD 2,666 ft.

N. CENTRAL TEXAS

Wildcats Pace Activities In Archer County

WICHITA FALLS.—Developments in Archer County saw one wildcat discovery completed, a confirmation location made, and another wildcat extension well running casing for tests.

The completion was L. T. Burns 2 D. L. Bishop, 3 miles northeast of Megargel, southwest corner of the county, which flowed 180.5 bbl. of 43°-gravity oil in 9 hours through 20/64-in. choke, from casing perforations at 4,644-48 ft. Pay section was a thin streak of Caddo lime, topped at 4,647 ft. and based at 4,702 ft. The well was dry in the Mississippian at 5,136 ft., total depth.

Location has been made by Fain & McGaha for a north offset test to the 1 Priebe, recent small Caddo discovery. The new well is to be the 1 J. T. Gant, 330 ft. from south and east lines, Section 6, Block 1, H&TC Survey. It is contracted to 4,800 ft. Location is in northern Archer County, and about 8 miles south of Wichita Falls.

In northwest Archer, ½ mile south of the Hunter Mississippian discovery, Moran Drilling Co. 1 T. B. Wilson, Section 2 S. P. Ellis Survey, prepared to run 7-in. casing. The wildcat yielded 45 ft. of oil on a drill-stem test from 4,961-71 ft., but recovered salt water only on a 1-hour test from 5,090-5,100 ft.

Strawn production for the Vogtsberger field of northern Archer County was reported at Tom B. Medders 1-A Margaret Smith Hancock, Section 7, Block 1, H&TC Survey, 7 miles south of Wichita Falls. Saturated sand was drilled from 3,851-71 ft., which recovered more than 1,100 ft. of clean oil on a 1-hour drill-stem test. Operators ran electrical survey and set casing on top of the section. The well was said to have flowed oil while cleaning out after drilling plug. Observers have rated it as an important well.

In Throckmorton County, 12 miles northwest of Throckmorton, Cities Service Oil Co. and Sinclair Prairie Oil Co. 1 SMS Ranch, Block 100, BBB&C Survey, recovered 58½ bbl. of oil and 24 bbl. of sediment and water in 24 hours of swabbing Caddo perforations from 4,924-50 ft.

Wichita River Oil Co. and Oil Exploration Production Co. have staked location for a 4,800-ft. rotary test 4 miles northwest of Murray. Location is 330 ft. from south and 1,520 ft. from east lines, Section 2634, TE&L Survey.

In Wise County, Big Bear Oil Co. 2 Hunt, C. F. McClain Survey, northwest extension test to the Chico field, ran 5½-in. casing for completion attempt. A drill-stem test from 5,866-74 ft. failed when the tool plugged after 5 minutes. Recovery in the pipe was 92 ft. of drilling mud.

Mid-Continent Petroleum Corp. 1 M. S. McBride, south of Paradise, recovered 5,000 ft. of salt water from perforations in the Ellenburger at 6,935-7,035 ft. The section had been treated with 1,000 gal. of acid. Operators prepared to squeeze.

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Southwest of the new Thrift field, Wright, Clark & Senkel 1 Hart-Lewis was drilling below 5,440 ft. in shale. A planned test in the top of the Caddo was not reported.

Seven miles southwest of Montague, Continental Oil Co. 1 W. C. Williams, J. Belew Survey A-99, had flowing oil from the Bend conglomerate. A 4-hour drill-stem test from 6,328-48 ft. flowed 94 bbl. of oil and recovered 2,850 ft. of clean oil, plus 210 ft. of oil-cut mud, with no water, when pipe was pulled. Bottom-hole pressure was 1,975 psi., and flowing pressure was 1,600 psi. It was to drill ahead to around 6,400 ft. and set casing.

In southwest Young County, 4½ miles southwest of Proffitt, Tom B. Medders et al 1 James R. Marshall, Block 755, TE&L Survey, flowed oil on a drill-stem test in the Caddo from 3,860-67 ft. Gas came to the surface in 4 minutes, and oil in 32 minutes. It was not allowed to flow for any period and no estimates were made. Operators were pulling testing tool, after which casing was to be set for production tests.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Archer County: L. T. Burns 2 D. L. Bishop, SW SW SW Blk. 52, L. M. Meade Pasture Subd., 3 mi. NE Megargel, flowed 180½ bbl. 43°-gravity oil in 9 hr., 20/64-in. choke, Caddo 4,644-48 ft., CP 575 psi., TP 150 psi., GOR 550 cu. ft., TD 5,135 ft.

Clay County: W. R. Dillard 1 W. Holt, Blk. 4, 1 mi. S Deer Creek, pumped 65 bbl. oil a day, sand 4,490-97 ft., TD 4,550 ft.

Jack County: Jack Grace Production Co. 1 L. L. Campsey, J. M. Hudson Sur., 9 mi. N Jacksboro, flowed 220 bbl. oil a day, ½-in. choke, conglomerate 5,492-5,504 ft., TD 6,231 ft., TP 225 psi., CP 850 psi., GOR 860 cu. ft.

Shackelford County: H. F. Pettigrew 1 T. C. Moore, NW NW NW Sec. 1560, TE&L Sur., 6½ mi. E Albany, pumped 29½ bbl. 43°-gravity oil a day, Ellenburger 4,483-4,495 ft., TD.

Stephens County: McElroy Ranch Co. 1 L. P. Martin, Sec. 1509, TE&L Sur., 10 mi. W Breckenridge, flowed 24,250,000 cu. ft. gas, shut-in pressure 450 psi., first gas 1,695 ft., perforated Caddo sections 3,428-74 ft., TD 4,410 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Featherston et al 1 Frank Jehlik, Blk. 132, Harris Subd., 3 mi. W Archer City, dry, TD 4,954 ft., Caddo 4,900 ft.

G. W. Graham 6 R. Campbell, J. Tomlinson Sur., 4 mi. S Anarene, dry, TD 5,279 ft., Caddo 4,624 ft., Barnett shale 5,162 ft., Mississippian 5,217 ft., elev. 1,175 ft.

Clay County: Akin & Dimock 1 E. B. Nutter, Sec. 30, H. Devers Sur., 2½ mi. NW Blue Grove, dry, TD 6,121 ft., Caddo 5,669 ft., had gas-cut mud.

Akin & Dimock 1 Nora Threadgill, Blk. 2, J. H. Belcher Sur., 3 mi. SW Blue Grove, dry, TD 4,715 ft., Vogtsberger 4,645 ft.

L. T. Burns 1 J. D. Copeland, Sec. 2636, TE&L Sur., 4½ mi. NW Shannon, dry, TD 5,453 ft. in Caddo.

Cooke County: J. W. Baldwin 1 Budlong, Kennedy Sur., 4 mi. N Marysville, dry, TD 3,910 ft. in shale.

Bridwell Oil Co. 1 Ada Williams, SPRR Sur., A-970, 4 mi. SW Bulcher, dry, TD 2,850 ft.

Fair & Scott 1 W. T. Bonner, 2½ mi. W Gainesville, dry, TD 1,936 ft.

E. L. Leslie 1 R. R. Kirby, H. Nail Sur., 3 mi. NW Era, dry, TD 1,545 ft.

Coleman County: Trinity Drilling Co. et al 1 Burrows, Sec. 27, HT&B Sur., 15 mi. E Coleman, dry, TD 2,683 ft., estimated 5,000,000 cu. ft. of gas daily in Caddo topped 2,081 ft., perforated 2,081-86 ft., and acidized with 2,000 gal.

Jones County: A. G. Hill and Walter Duncan 1 W. C. Hall, Sec. 1, Blk. 17, T&P Sur., 1 mi. E Truby, dry, TD 2,752 ft.

J. R. Stewart 1 W. B. Moore, David Bruce Sur., 4 mi. N Tye, dry, TD 2,263 ft., Dotham 1,830 ft., sand 2,020 ft., Saddle Creek 2,180 ft., Flippen sand 2,224 ft.

Taylor County: W. E. Bakke 1 Walter McCartney, Sec. 129, J. McSherry Sur., 1 mi. W Tye, dry, TD 2,707 ft., Flippen 340 ft., Cook 2,375 ft., Swastika 2,680 ft., elev. 1,824 ft.

Throckmorton County: James H. Snowden 1 W. B. Ewalt, Sec. 2333, TE&L Sur., 7 mi. E Throckmorton, dry, TD 4,985 ft., Caddo 4,086 ft., had no shows of gas.

Wichita County: Frank Wood 1 J. A. Moore, Blk. 45, Red River Valley Lands, 3 mi. W Burkburnett, dry, TD 2,006 ft., sand with oil show 1,928-30 ft.

Wilbarger County: Heldt & Gay 1 G. W. Turner, Sec. 11, Blk. 10, H&TC Sur., 2½ mi. W Odell, dry, TD 2,402 ft.

Young County: Lipscomb & DeLange 1 W. I. Clifton, Sec. 100, TE&L Sur., 2½ mi. N Padgitt, dry, TD 5,111 ft., Mississippi 5,047 ft.

PERMIAN BASIN

Seaboard et al Tests Pennsylvanian Prospect

MIDLAND.—Prospects of a new Pennsylvanian lime discovery in southwestern Borden County was attracting considerable interest this week at Seaboard Oil Co. of Delaware and Pan American Production Co. 1 T. J. Good prepared to set casing for production tests. Location of the well is 1,985 ft. from south and 2,004 ft. from west lines, Section 37-33-T4N-T&P, and about 6½ miles northwest of Pennsylvanian production in the Vealmore field of northwest Howard County, at approximately the same depth.

The first drill-stem test to produce oil in the 1 Good was from 7,910-20 ft., open 1 hour and 10 minutes. Using ⅝-in. bottom choke and open top, gas surfaced in 19 minutes at a steady blow and recovery was 450 ft. of oil plus 20 ft. of oil-cut mud. The next test was run from 7,920-40 ft., using ½-in. bottom choke and open top, with the tool open 1 hour and 42 minutes. Gas came to the top in 19 minutes, mud in 38 minutes, and flowing oil 1 minute later which gaged 22 bbl. in 1 hour. Total depth was 7,940 ft. Operators have identified the pay section as Canyon lime.

In Gaines County, Magnolia Petroleum Co. 1 Alice Flanagan estate, SW NW 9-A23-PSL, east offset to the Ellenburger discovery of the Flanagan field, reported flowing oil on a drill-stem test in the Clear Fork. The 1-hour and 32-minute test, from 7,169-7,265 ft., had gas at the surface in 4 minutes, mud in 23 minutes and oil in 28 minutes. It cleaned into pits for 4 minutes then gaged 45.9 bbl. of oil in 1 hour through ⅝-in. choke. A second test from 7,265-85 ft., open 2 hours and 40 minutes, recovered 3,820 ft. of oil, plus 182 ft. of heavily oil and gas-cut mud, and 121 ft. of sulfur water. It was drilling ahead to the Ellenburger.

South of the Flanagan discovery, in NW NW 12-A23-PSL, George P. Livermore, Inc., 1 Joe Head also had oil on drill-stem tests of the Clear Fork. The first drill-stem test from 7,049-7,187 ft. recovered 180 ft. of oil and gas-cut mud. A 2½-hour test from 7,184-7,249 ft. brought gas to the surface in 6 minutes and recovered 4,069 ft. of 38.5°-gravity oil, plus 720 ft. of heavily oil-cut mud.

The Flanagan pool opener, Shell Oil Co., Inc., 1 Hawkins, also had prospects of commercial production in the Clear Fork, but neither it nor the 1 Head got flowing oil from that section.

In Scurry County, nearly 4 miles southeast of the North Snyder (northwest-southeast), Canyon limestone development, Placid Oil Co. 1 R. H. Odom, NW NW 388-97-H&TC, recovered oil on a drill-stem test from 7,387-98 ft., in the Strawn section of the Pennsylvanian. With the tool open 3 hours, it produced a steady blow of air throughout, and recovered 30 ft. of 34°-gravity oil and 10 ft. of heavily oil and gas-cut mud. When pipe was pulled, it contained some 6,000 ft. of gas. The well was variously reported to have drilled a few feet deeper and to have obtained flowing oil on another drill-stem test. It is contracted to the Ellenburger, around 8,000 ft., and was drilling ahead.

The 1 Odom is east of Placid 1 Davis, Ellenburger failure in NW SE Section 387, which was last reported pumping oil and water from perforations at 6,725-32 ft., in the Canyon lime. Placid 1 Mrs. W. W. Early, approximately 1 mile south and slightly east of the 1 Davis, was unofficially reported to be running pipe for tests of the Strawn. It was reported at 7,548 ft., total depth.

Northwest of the North Snyder field, Lone Star Producing Co. 1 M. M. Maule, SE SE 451-97-H&TC, had total depth at 7,344 ft. and awaited orders. On the field's other end, J. L. Collins 1 Parks, 442-97-H&TC, cored 11 ft. of shale and sand with good oil shows, from 6,202-22 ft., and prepared to drill-stem test the section. It was said to be above the Canyon lime.

In the northeast corner of Howard County, Magnolia 1-A Herman Gartner, NW NW 67-20-Lavaca Navigation Co. Survey, was reported to have recovered 30 ft. of slight oil and gas-cut mud on a drill-stem test of the Ellenburger at 8,519-30 ft. It was coring ahead in dolomite below 8,530 ft.

A 10,000-ft. Pennsylvanian test was announced this week for northern Upton County, some 2½ miles southeast of Magnolia's 1-A TXL discovery. Republic Natural Gas Co. was reported to have farmed out a portion of Section 44-40-T&P from Magnolia, which carried an obligation to test the Pennsylvanian. Observers believed the well might be carried on to the Ellenburger, if showings warranted. Magnolia is contributing to the venture, which is expected to be under way by May 1.

In the Benedum field, Humble Oil & Refining Co. 1-B Barnett, second Silurian producer for the area, NW NW 39-Y-TCRR, completed for 205.6 bbl. of 57°-gravity oil in 24 hours, flowing through 14/64-in. tubing choke from casing perforations at 11,375-420 ft. It is 1¼ miles west of the field's Silurian discovery.

Three additional permits for drilling in the Bronte townsite, Coke County, were issued by the Texas Railroad Commission, bringing the total to 8, according to field reports. The three new locations are to be: Howard Hill and Earl B. Persons, of Grand Saline, 1 Homer Vaughn and Edith Vaughn, center of Lot 2, in Block 13. Same operators' 1 E. M. Beaver is on a 1¼-acre tract in the 80-acre W. W. McCutcheon Survey. Third test is S. E. Adams, of San Angelo, 1 C. A. Eubanks, on the 1.27-acre tract in the H&TC Survey 452. In the Bronte field, west of the town, Placid Oil Co. 1 Foreman, SE SE 450-1A-H&TC, was swabbing at 4,994 ft. The Canyon section from 4,982-94 ft. previously yielded 1,000 ft. of clean oil on a drill-stem test. Hickok & Reynolds, Inc., and Dan Auld 2 E. C. Rawlings, SE NW 453-1A-H&TC, drilled ahead below 3,000 ft. Humble 1 Nannie Ash, 453-1A-H&TC, pumped 172 bbl. of fluid, being approximately 50 per cent water, from perforations at 4,340-70 ft. Farther south, Humble 2 Ash was delayed by twisted drill pipe at 2,285 ft.

L. G. Yarborough & Sons 1 Addie Fletcher, wildcat 1½ miles west of the Bronte field, in SE SE 448-1A-H&TC, was said to be drilling below 6,000 ft. Details were not released. Two miles north of Bronte, J. K. Wadley 1 Sam Bray, 330 ft. from north and 558 ft. from west lines, 439-1A-H&TC, was drilling near 2,000 ft. after making repairs.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Gaines County: Argo Oil Corp. 1-C E. H. Jones, Sec. 32-AX-PSL, 1¾ mi. NW of 1-N Jones, 1948 Devonian discovery, NW corner of county; dry, TD 11,419 ft., Devonian 11,360 ft., elev. 3,631 ft.

Republic Natural Gas Co. 1-A J. C. Sartin, Sec. 19-C34-PSL, NW of Seagraves, dry, TD 7,213 ft., San Andres 5,200 ft., San Angelo 6,980 ft., elev. 3,425 ft.

Pecos County: M. E. Davis 1 C. E. Blackmar, SE SW 25-8-H&GN, 10 mi. SE

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Grandfalls, dry, TD 6,028 ft., Delaware lime 4,220 ft., elev. 2,530 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Northeast of Crossroads field, operators at Magnolia Petroleum Co. 1 Cox-Federal, 1-8s-36e, were still calling the returns Pennsylvanian in drilling at 12,263 ft., in lime, shale, and chert.

Mid-Continent Petroleum Co. 1-B U. D. Sawyer, NE NW 34-9s-36e, southwest offset to the Crossroads discovery, completed in the Mississippian according to operators, for a pumping potential of 210 bbl. of oil a day. Total depth was 12,750 ft., plugged back to 12,474 ft. Elevation was 4,039 ft. There was no acid used in the well.

Amerada Petroleum Corp. 1-CA State, 9-10s-36e, was drilling below 10,985 ft. in lime. Amerada 1-BTA State, 2-12s-33e, drilled ahead below 10,348 ft., in Pennsylvanian lime and shale. Same operators' 1-BTB State, NW NW 26-12s-33e, was running casing at 300 ft.

Humble Oil & Refining Co. 1-X State, 31-11s-35e, was still in the Abo section in drilling below 8,310 ft. According to reports it is about 600 ft. low to Amerada's 1-BTA well. The section on which it was correlated was not specified, but presumably was the Abo, which operators now place at 7,840 ft. Elevation is 4,154 ft.

Amerada 1 J. R. Hamilton, 35-16s-38e, ran a drill-stem test at 12,446-463 ft. Packer failed in 25 minutes and recovery was the water blanket plus 1,350 ft. of slightly oil and gas-cut drilling fluid, and 1,450 ft. of drilling mud. Another test was being run.

Kewanee Oil Co. 36 Baish, Maljamar field test, 28-17s-32e, plugged back to 6,900 ft. and waited on a squeeze job for perforations. Swabbing recovered salt water from intervals from 5,335-5,400 ft.

Phillips Petroleum Co. 1 Shipp, 20-18s-37e, was down for repairs at 12,012 ft. in dolomite. Stanolind Oil & Gas Co. 1 South Mattix Unit, 15-24s-37e, was drilling in green shale of the Simpson at 9,245 ft. A drill-stem test at 8,983-9,054 ft., open 1 hour and 45 minutes, recovered 90 ft. of slightly oil-cut mud. Recovery from a 45-minute test at 9,035-95 ft. was 35 ft. of mud with no shows.

Phillips 1 McCormick, 18-25s-35e, 5 miles southeast of Ochoa, was dry at 7,020 ft. in Delaware sand. Last drill-stem test from 6,893-7,020 ft., open 1 hour, recovered 635 ft. of drilling mud, plus 205 ft. of salt water.

MICHIGAN

Stepouts of Dundee Pools Extend Producing Limits

MOUNT PLEASANT.—Expansion of two new Dundee oil pools demanded the center of attention in Michigan during the past week. Both the Isabella Dundee field, Isabella County, and the Mearls pool, Oceana County, were being closely followed as new completions in both areas continued to push the producing limits of these fields further from the discovery producers.

Merrill Drilling Co. had completed one new flowing well in Isabella field, which flowed at the rate of 510 bbl. in 13 hours natural through a restricted choke, and had another field development well within a few feet of the objective dolomitic pay.

McClanahan Oil Co. and George F. Herr 1 Osborn, north offset to the Mears field discovery well, Oceana County, was completed good for 125 bbl. a day after acidization at a Dundee total depth of 2,208 ft. Well was being flowed through a restricted choke.

Another Mears field offset, Carter Oil Co. 1 State-Golden A, diagonal northeast offset to the Mears discovery producer, was swabbing and flowing from 5 to 6 bbl. an hour from the Dundee following a small 300-gal. acid shot. There were three other active locations in Mears field this week.

The new producer in the Isabella field, Merrill 1 House, NW SE NW 18-15n-4w, Isabella County, was the best producer in the field. Well was higher on the Dundee and pay than either of the two previously completed oil wells and had expanded the known producing limits of the pool another ¼ mile to the southeast. Immediately following the completion of this producer, five offset locations were announced for immediate drilling.

Some indication of the southern limit of Isabella field was being determined this week, however, as Roosevelt Oil & Refining Corp. 1 Halfman et al, NW NW NW 20-15n-4w, a full mile south of the Sheahan discovery, was being drilled 18 ft. in the Dundee objective with neither oil, water nor dolomitic section showing.

MICHIGAN WILDCAT FAILURES

Berrien County, Pipestone Township: Ohio Oil Co. 1 Wolf, SW NW NE 1-5s-17w, Traverse 807 ft., dry, TD 825 ft.

Hillsdale County, Camden Township: Hugh Rogers 1 Zeiter, SE SE NE 24-8s-4w, Trenton 2,905 ft., dry, TD 3,357 ft.

Midland County, Geneva Township: C. W. Collin 1 State, SW SW NW 31-15n-2w, Dundee 3,642 ft., dry, TD 3,740 ft.

Van Buren County, Geneva Township: Norman L. Stevens 1 Monk, NW NE SW 26-1s-16w, Traverse 1,085 ft., dry, TD 1,098 ft.

ROCKY MOUNTAIN

Phosphoria Shows Oil in Carbon County Location

DENVER.—Oil-cut mud was recovered on test of the Phosphoria at British-American Oil Producing Co.'s Clark Fork wildcat at 1 Government, McClennan, C NE NE 26-9s-22e, Carbon County, Montana, this week. The test was made between 9,028-9,101 ft., total depth, and on a 1-hour test gas was recovered at the surface in 34 minutes, with 1,680 ft. of oil and gas-cut mud. The mud was 40 per cent oil cut, and gas was estimated at 8,000 cu. ft. daily. Top of the Phosphoria was found at 9,030 ft., and Tensleep at 9,093 ft., but the zone below 9,060 ft. was considered too hard and tight to produce. Production at this discovery was compared with initial tests made by Seaboard Oil Co. in Silver Tip field, 8 miles southeast of Clark Fork, where a Phosphoria discovery was made last year. Seaboard has developed the Phosphoria as well as Frontier and Tensleep production in the Silver Tip area during the past year. At Clark Fork British-American cemented 7-in. casing at 9,029 ft. on top of the Phosphoria, prior to testing the formation. The well was originally scheduled as a Madison test but may now be completed at the present depth after further testing.

Official reports of Western Natural Gas Co., Byrd-Frost, Inc., et al second well on the Dove Creek structure, Montezuma County, Colorado, are lacking as to tests and formation tops, and the well has temporarily been made a tight hole. The well is 1 White, C NW NE 9-38n-19w, 1 mile southwest of the discovery, which made gas and distillate from a zone in the top of the Paradox (Pennsylvanian) formation. The present well is believed below 6,200 ft. in the same zone productive in the discovery. The well is of importance to development not only on the large Dove Creek structure, but also for future wildcat activity in the entire San Juan Basin area.

Water was recovered on drill-stem test in the base of the Tensleep at Phillips Petroleum Co.'s deep test in Golden Eagle field, Hot Springs County, Wyoming. The well topped Tensleep at 9,336 ft., and with total depth at 9,582 ft., 246 ft. in the Tensleep, the well made 180 ft. of oil, 270 ft.

of gas and water-cut mud, and 90 ft. of sulfur water. On a test between 9,458-9,542 ft. the well showed no water, and it is probable the operator will plug back to this zone for completion of the well as a new pay discovery in the field. On previous tests in the top of the Tensleep the well flowed 21 bbl. of oil per hour. Casing has been cemented at the top of the sand for completion in the Tensleep, although on tests the well made oil in the Phosphoria.

Shell Oil Co. is drilling below 10,703 ft., probably in the Madison, at its 1 Crow-Tribal, NE NE NE 26-9s-37e, on the Ash Creek structure, Big Horn County, Montana. Tensleep was topped at 9,401 ft., and there has been no report on top of Madison. On drill-stem test 10,202-91 ft. the well made 1,980 ft. of water in 55 minutes. This operation is of importance in future exploratory drilling on the northwest side of the Powder River Basin, and location was made following siesmic work in the area by Shell.

Tests are continuing at The California Co.'s wildcat at 1 Unit, C SW NW 12-36s-1e, Upper Valley, Garfield County, Utah, with the well now making 450 bbl. of oil daily with only a slight amount of water. The wildcat has been plugged back to 8,786 ft., with casing cemented at 8,765 ft., and is producing from a lime zone in the Pennsylvanian formation at that depth. The discovery is considered of great regional importance as the first well in the Kaiparowits area to find oil. The oil is 14.5° gravity, and no market outlet has been provided for the oil.

Seaboard Oil Co. has abandoned its interesting wildcat in the Bitter Creek area at 1 Unit, NW SW NW 10-10s-22e, Uintah County, Utah, at 8,520 ft., total depth. Some gas was recovered from sands in the Tertiary at around 8,000 ft., but there was not sufficient volume for commercial production.

New locations.—There were 15 new locations, with 5 in Wyoming, 1 in Colorado, 6 in Montana, 2 in Utah, and 1 in western Nebraska. The western Nebraska location was made by Ohio Oil Co. at 1 Egging, NE NE NE 11-15n-49w, Cheyenne County, in the Sidney area. The well is to test Pennsylvanian and possibly deeper beds, and location was made following seismic work in the area by Ohio a year ago. This well be the first deep test to be drilled in this area of Nebraska. Location has been made by Continental Oil Co. for a second well on the Afton structure, Lincoln County, Wyoming. The well will be 2 Unit, SE SW NE 9-30n-119w, near a well recently abandoned by Continental after encountering steep dips in the Thaynes.

Completions.—There were 13 completions, with a total daily initial of 955 bbl. of oil. In Wyoming one of the 8 completions was Tide Water Associated Oil Co.'s 84-11 Unit, SE SE NE 11-36n-64w, on the Bright Unit, Niobrara County, which was abandoned at 7,929 ft., total depth, in the Spearfish. No shows were reported for the wildcat. J. G. Dyer et al abandoned the Loveland, Colorado, wildcat after failing to find commercial gas production on plugging back to the Hygiene. Sands below the Hygiene were reported hard and tight.

WYOMING WILDCAT FAILURE

Niobrara County, Bright Unit: Tide Water Associated Oil Co. 84-11 Unit, SE SE NE 11-36n-64w, TD 7,929 ft., abnd., Pierre 905, Niobrara 4,437, Greenhorn 5,410, Newcastle 6,420, Fall River 6,597, Fuson 6,701, Lakota 6,742, Morrison 6,827, Morrison sand 7,008, Sundance 7,035, first Sundance 7,150, Basal Sundance sand 7,350, Spearfish 7,452.

COLORADO WILDCAT FAILURE

Larimer County, Loveland: J. G. Dyer et al 1 Trindle, CW½ NW SE 30-5n-68w, TD 5,436, PB 1,925, abnd., Hygiene sand 1,354-1,411, Hygiene sand 1,721-1,800, Niobrara 4,327, Timpas 4,640 (sample), Frontier 4,645-4,700, Muddy 5,147, Dakota 5,340, Lakota 5,430.

OKLAHOMA

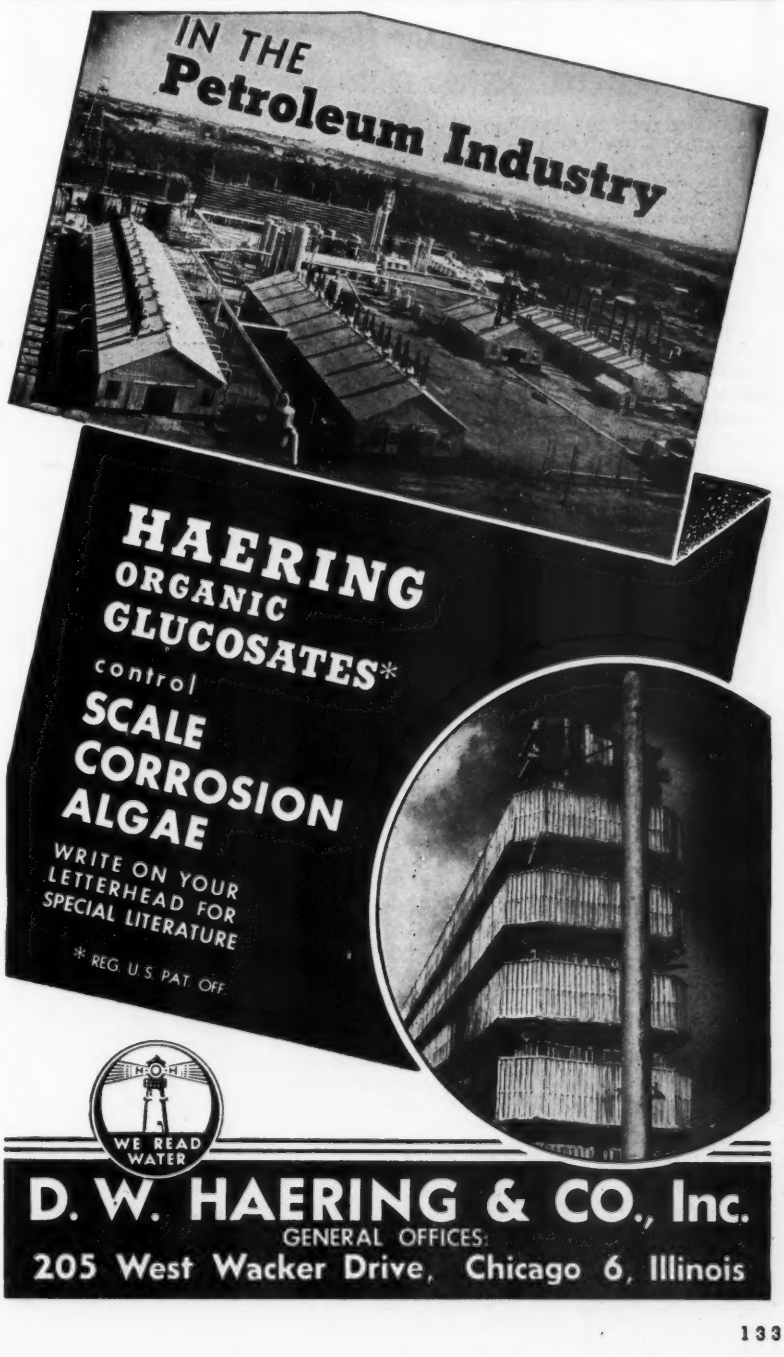
New Pay Horizon Opened In Fourdee Field Extension

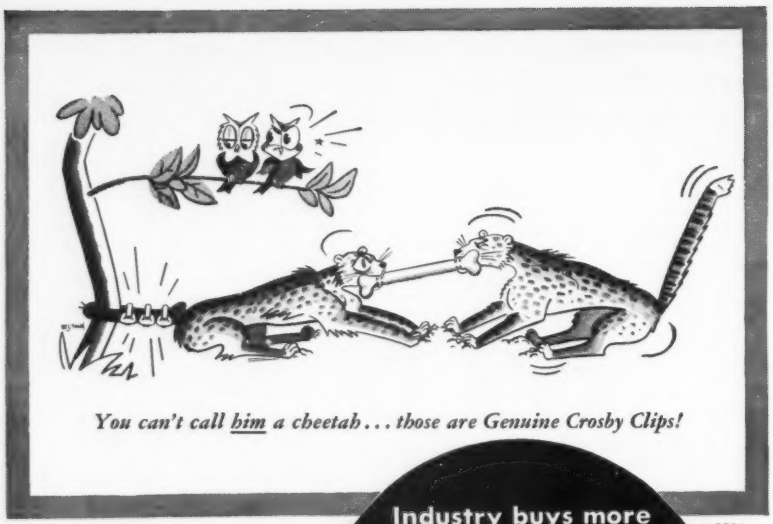
ANOTHER productive horizon for the Fourdee field, Noble County, has been opened and a westward extension of the field's limits established with the completion by Midland Co-operative Association and Eason Oil Co. of their 1 Hughes, SE NE NE 26-22n-2w, as a gas-distillate well in the Bartlesville sand. Previously production has been largely from the Mississippi lime and from the Marshall and Wilcox sands.

Bartlesville production in the new well is from an interval at 4,694-4,730 ft., where casing was perforated. Total depth is 4,785 ft. The well flowed at the rate of 6 bbl. of distillate per hour with 19,300,000 cu. ft. of gas per day through 1-in. choke. Pressures at this rate were 880 psi. on the tubing and 1,500 psi. on the casing. With well shut in, pressures built up to 1,760 psi. on the tubing and 1,700 psi. on the casing.

In the Southeast Polo pool, also in Noble County, Derby Oil Co. got a good Misener sand producer in its 6 Wiegal, SW NW SE 2-21n-2w. The well flowed 292 bbl. of clean oil in 24 hours through ¼-in. choke with 500 psi. pressure on the tubing and 1,210 psi. on the casing. Production is from open hole at 4,983-94 ft.

Magnolia Petroleum Co. 1-B Stephens, NW NW NE 13-3n-3w, northwest flank of the Southwest Antioch pool, Garvin County, gave indications of a good well in the Gibson sand. On a 60-minute drill-stem test at 6,672-6,718 ft. it showed gas in 7 minutes and flowed 4 bbl. of clean oil in 10 minutes.





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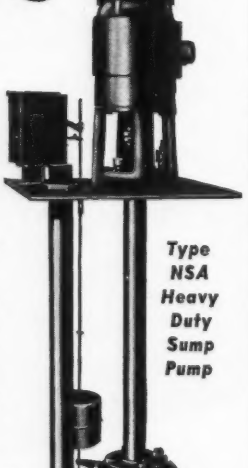

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Approximately 1,300 ft. of oil was recovered when pipe was pulled. Hole is being deepened.

Completions in other fields along the "Golden Trend" in Garvin County included Carter Oil Co. 1 McPherson-Cronian, NE NW NE 32-4n-2w, South Mayesville, which flowed 551 bbl. of 40.3° oil in 19 hours through ¾-in. choke from the First Bromide sand with casing perforated at 6,770-81 ft., 6,785-92 ft. and 6,800-12 ft. The same company's 3 Dena Sullivan, NW SW NE 9-2n-2w, Northeast Elmore pool, flowed 714 bbl. of 41° oil in 24 hours through ¾-in. choke from the Third Deese sand at 6,643-67 ft. Its 2 Hall, C SW SW 3-4n-3w, Southeast New Hope pool, flowed 339 bbl. of 42° oil in 22 hours through ¾-in. choke from the Third Deese sand at 7,007-22 ft.

Earl Lewis et al 2 Lewis, SE SW SW 17-3n-3e, Garvin County, pumped 59 bbl. in 24 hours from the Bromide sand at 2,085-90 ft. to extend the small Lewis pool.

Magnolia Petroleum Co. 2 Seeley, NW NE NE 24-5s-1w, east flank of the Brock pool, Carter County, flowed 161 bbl. of oil in 15 hours with a gas-oil ratio of 44,000 cu. ft. per barrel on a test in open hole at 4,183-92 ft. Flow was through the casing. The well has been killed to deepen.

Indications of another pool for western Hughes County are given at J. A. Chapman 1 McKan, NE SE NE 14-8n-8e, which swabbed and flowed at the rate of 1½ bbl. of oil per hour with an estimated 750,000 cu. ft. of gas from the Cromwell sand. Total depth is 3,315 ft. with 5½-in. casing at 3,297 ft. Since then the formation has been shot with 20 qt., and further testing is under way. The location is east of the Northeast Wewoka field and north of the North Jefferson pool.

Fordee Rhodes and Texinia Corp. 1-A Colon, NW NE SW 28-17n-4e, a wildcat in the extreme northern part of Lincoln County, is being put on the pump after showing for a small pumper and pool opener from the Bartlesville sand, in which casing was perforated at 3,802-08 ft. Bottom of plugged back hole is 3,948 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Love County: Cox 1 Strozier, SE SE NE 27-6s-2w, pumped 132 bbl. of 35°-gravity oil per day from sand at 6,986-7,014 ft.; Home Creek 2,787 ft., Adams Branch 3,276 ft., Palo Pinto 4,159 ft., Strawn 4,407 ft., TD 7,250 ft.

Pottawatomie County: New pay in West Tecumseh — Cities Service Oil Co. 1 Fleming, NW SW SW 31-9n-3e, flowed 25 bbl. of oil from unconformity at 4,938-39 ft. and Hunton at 5,023-26 ft., TD, pool opener worked over.

OKLAHOMA WILDCAT FAILURES

Cotton County: Pearson 1 Kirkland, SW NW SW 29-3n-10w, dry, TD 1,015 ft., no tops reported.

Garvin County: Cohen 1 Richardson, NE SW SE 7-1n-1e, dry, TD 4,659 ft., no tops reported.

Gillespie 1 McGee, SE SE SW 33-4n-1w, dry, TD 5,325 ft., solid lime 4,640 ft., bromide dense 4,965 ft., first bromide sand 5,118 ft., second bromide sand 5,287 ft.

Hughes County: Diamond 1 Butts, NE NE SW 13-7n-9e, dry, TD 3,459 ft., Booch 2,751 ft., lower Booch 2,998 ft., Hartshorne 3,018 ft., Gilcrease 3,300 ft., Gilcrease sand 3,372 ft.

Lincoln County: Gaskill 1 Schima, SW SW NE 22-12n-5e, dry, TD 4,760 ft., Hogshooter 2,175 ft., Checkerboard 2,533 ft., Oswego 3,402 ft., Earlsboro 3,740 ft., Inola 3,842 ft., Bartlesville 3,855 ft., brown lime 3,973 ft., Caney 4,110 ft., Mayes 4,235 ft., Woodford 4,403 ft., Hunton 4,440 ft., Sylvan 4,525 ft., Viola 4,617 ft., Wilcox 4,697 ft., second Wilcox 4,739 ft.

Porter 1 Longton, SW NW NE 22-15n-5e, dry, TD 3,807 ft., Hogshooter 2,290 ft., Lalton 2,300 ft., Checkerboard 2,600 ft., Oswego 3,339 ft., Prue 3,382 ft., Verdigris 3,428 ft., Red Fork 3,666 ft., Inola 3,762 ft.

Logan County: Toklan 1 Black, NE SE NE 3-16n-1e, dry, TD 5,355 ft., Avant 3,116

ft., upper Hogshooter 3,727 ft., lower Hogshooter 3,818 ft., Checkerboard 3,996 ft., Oswego 4,445 ft., Prue 4,610 ft., Mississippi lime 4,850 ft., Woodford 4,878 ft., Harrington-Hunton 4,905 ft., Chimney Hill 4,988 ft., Sylvan 5,035 ft., Viola 5,123 ft., Wilcox 5,213 ft., second Wilcox 5,343 ft.

Payne County: Mulberry 1 Cobble, NE NW SE 11-19n-6e, dry, TD 2,962 ft., no tops reported.

Seminole County: Logan 1 Lack, SW SW SE 30-9n-8e, dry, TD 1,952 ft., Oswego 1,814 ft., Calvin 1,854 ft., Calvin sand 1,884-1,912 ft.

Stephens County: Grimes 1 Sam, NE NE NE 8-3s-6w, dry, TD 2,527 ft., sand 1,700-25 ft., 1,768-80 ft. and 1,805-25 ft., Canyon lime 2,459 ft.

Atkinson 1 Federal Land Bank, NW NW NW 15-3s-6w, dry, TD 2,523 ft., Canyon lime 2,410 ft., Arbuckle 2,498 ft.

ILLINOIS

Rapid Development in North Maud Pool

MATTOON.—The new development at the south end of North Maud pool is expanding at the rate of three or four completions each week. Cities Service Oil Co has completed 3-B Brines, SW SW SW 21-1s-13w, Wabash County, with an initia production of 88 bbl. per day from the Benoist. The same operator swabbed 17. bbl. of oil in 21 hours at 4-B Brines, NW SW SW of the same section.

In the southern extension of the pool, Illinois Mid-Continent Co. completed 1 McGregor, NE NW NE 29-1s-13w, for 20 bbl. per day, and still further south, C. E. Skiles completed 4 Parmeter, SW NE SW 33-1s-13w, for 56 bbl. daily from the Benoist at 2,540-56 ft.

In Maud pool and to the southeast of the McGregor well, Calvert & Willis and Mahutsha Oil Co. 4 Reisinger, NE NE NE 4-2s-13w, swabbed 104 bbl. of oil in 14 hours. Production is from the Cypress at 2,399-2,413 ft. Operator has set casing to 2,398 ft. The same operators completed the first well in this extended area on the west side of the pool early in February. The well, 1 Reisinger, SE NE NE of Section 4, was completed for 330 bbl. per day.

A Clark County well is reported to have had a show of oil in the Devonian. The well, Schafer, Granholm, and Dayton 1 Cusick, NW NE SW 20-11n-10w, is drilling below 2,148 ft. after testing a show of oil in the Devonian at 2,060 ft. This is just across the state line from Vigo County in Indiana where most of the production is from the Devonian.

In the Bible Grove area of Clay County, Ashland Oil & Refining Co., has a good Rosiclare well at 3 Schniepp heirs, NW NW SW 5-5n-7e. The well is still testing pay at 2,798-2,811 ft. but was reported to be pumping at the rate of 235 bbl. per day.

Ashland Oil & Refining Co. has a possible extension on the west side of Crossville pool in White County. The well, Ashland 1 W. T. Hardy, SW SW SE 35-4s-10e, swabbed 6 bbl. of oil in 12 hours from the Tar Springs at 2,370-84 ft.

ILLINOIS SUCCESSFUL WILDCAT

McDonough County: D. E. Lambert 1 W. McGinnis, NW NW SW 28-4n-4w, (4th PM), IP 2½ bbl., Devonian 435-46 ft., TD 446 ft.

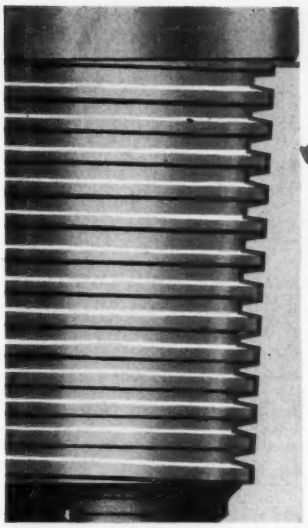
ILLINOIS WILDCAT FAILURES

Christian County: National Associated Petroleum Co. and Continental Oil Co. 1 W. E. Tranghber, SE SE SW 24-14n-1e, dry, TD 2,410 ft.

Clay County: Perry Fulk 1 Schnorf, NE NE SW 32-5n-6e, dry, TD 2,842 ft.

McDonough County: W. Vette 1 Carl Ruebush, SE NW SW 31-7n-3w, (4th PM), dry, TD 706 ft.

Macoupin County: R. K. Lump 1 Mueller,



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Saline County: B. M. Heath 1 C. M. Wasson, NE NW NE 18-9s-6e, dry, TD 2,379 ft.
Wayne County: Robinson & Puckett 1 A. Tate, NE NE SW 1-2s-8e, dry, TD 3,467 ft.

KANSAS

Wildcat in Rooks County Shows Lansing Production

CONTINENTAL OIL CO. 1 Yoke, SE SE NE 4-9-18, a wildcat 2 miles east of the East Barry pool, Rooks County, recovered 540 ft. of oil and 400 ft. of heavily oil-cut mud following a 30-minute drill-stem test in the Lansing lime. The test was made at 3,260-82 ft. with top of the formation at 3,190 ft. (—1,180 ft.). Preparations are being made to complete.

Hole was drilled to 3,511 ft. in the Arbuckle, topped at 3,474 ft. (—1,464 ft.) but no showings were found in this formation. Casing has been run on the Lansing.

Aladdin Petroleum Corp. 1 Brodie, SW SW SE 23-19-12, discovery well of the North Hammer pool, Barton County, has been given a potential rating of 511 bbl. of oil per day. Production is from the Arbuckle lime, topped at 3,344 ft. (—1,537 ft.) and bottomed at 3,364 ft. Location is a mile north of the Hammer pool. Good showings also were encountered in the Lansing lime. The same company has completed its 2 Brodie, NE SW SE 23-19-12, a location northeast of the discovery well, as a confirmation producer. It is rated at 476 bbl. per day with the Arbuckle topped at 3,353 ft. (—1,544 ft.).

A mile southeast of the Merten pool, also in Barton County, B and R Drilling Co. and Wilcox Oil Co. have completed their 1 Kuhlman, NW SW SW 12-19-15, with a potential of 121 bbl. of oil per day. Total depth is 3,568 ft. in the Arbuckle, topped at 3,531 ft. (—1,597 ft.).

El Dorado Refining Co. and associates have extended the Northwest Burnett pool, northern Ellis County, a half mile south, by their 1 Meistrell, NW NE SW 3-11-18. Completed in the Arbuckle, topped at 3,531 ft. (—1,559 ft.), the well has been given a potential rating of 190 bbl. per day.

Westgate-Greenland Oil Co. and Mallard Drilling Co. 1 Allphine, SW SW SW 12-21-13, a mile southeast of the East Rothgarn pool and 1½ miles northwest of the Mueller pool, Stafford County, looks like another discovery following showings encountered in the Arbuckle, topped at 3,553 ft. (—1,688 ft.). Rotary hole was drilled to 3,555 ft. and 5-in. casing run to 3,553 ft.

Heller and B and R Drilling Co. 1 Carpenter, SE SE SW 13-11-23, Trego County, is extending the Wakeeney pool a mile east. Favorable showings were found in the Lansing, topped at 3,524 ft. (—1,253 ft.). Casing has been run to 3,700 ft. No showings were encountered in the Arbuckle, which was topped at 4,007 ft. and drilled to 4,050 ft.

KANSAS SUCCESSFUL WILDCAT

Rooks County: Birmingham & Bartlett Drilling Co. 1 Marcotte, SE SW NW 18-10s-19w, 3,000 bbl. of oil per day from Arbuckle at 3,765-70 ft.; anhydrite 1,630 ft., Heebner 3,424 ft., Kansas City 3,466 ft., TD 3,770 ft.

KANSAS WILDCAT FAILURES

Butler County: E. H. Adair 1 Lilley, NE NE SW 15-23s-5e, dry, TD 2,424 ft., Lansing 1,610 ft., Kansas City 1,865 ft., basal Kansas City 2,020 ft., cherty conglomerate 2,220 ft., Arbuckle 2,242 ft., granite wash 2,362 ft.

H. & M. Drilling Co. 1 Truman, SW SE SE 21-25s-3e, dry, TD 2,825 ft., Kansas City 2,025 ft., conglomerate 2,750 ft., Mississippi chat 2,770 ft., Mississippian 2,781 ft.

Chase County: Amerada Petroleum Co. 1 Jensen, NE NE NE 24-19s-7e, dry, TD 2,165 ft., no tops reported, stratigraphic test.

Nemaha County: Carter Oil Co. 1 Draney Heirs, SE SE SE 13-3s-14e, dry, TD 3,152 ft., Howard 806 ft., Topeka 836 ft., Heebner 1,172 ft., Kansas City 1,308 ft., Marmaton 1,661 ft., Cherokee 1,949 ft., Mississippi 2,637 ft., Kinderhook 2,800 ft., Hunton 3,078 ft.

Russell County: Derby Oil et al 1 Jellison, SE SE NW 13-13s-15w, dry, TD 3,280 ft., Lansing 2,989 ft., Arbuckle 3,250 ft.

Sedgwick County: Aledo et al 1 Clark, NW NE NE 12-26s-1e, dry, TD 3,040 ft., Kansas City 2,554 ft., basal Kansas City 2,713 ft., conglomerate 2,957 ft., Burgess 3,017 ft., Mississippian 3,035 ft.

Stafford County: Lion Oil Co. 1 Budde, SW SW SW 32-34s-12w, dry, TD 4,240 ft., Heebner 3,396 ft., Lansing 3,575 ft., Viola 3,994 ft., Simpson 4,109 ft., Arbuckle 4,173 ft.

OHIO, KENTUCKY

Big Gas Well Extends Medina County Pool

COLUMBUS.—Another big well extended one location to the north the new Litchfield Township pool in Medina County. The Ohio Fuel Gas 2 Clyde Browand, Lot 5, drilled through the upper Clinton at 2,608-18 ft. and finished at 2,620 ft. with a natural open flow of 7,210,000 cu. ft. of gas with rock pressure of 1,160 psi.

Two producers were added to Bladensburg pool in Jackson Township, Knox County, by the Preston Oil Co.'s 2 Ella Blue, Section 17, which made 65 bbl. natural and 102 bbl. in the first 24 hours after shot. The company's 3 Ray Earlywine, Section 7, made 12 bbl. of oil natural and 62 bbl. the first day after shot.

The Four Way 4 Mary Walser, Section 27, Hopewell Township, Perry County, reported drilled in last week, was shot and flowed 140 bbl. of oil in the first 24 hours.

The Ohio Fuel 2 Grace Toki, Section 11, Bearfield Township, Perry County, came in as a fair well to extend the Sayre pool one location to the northeast. The Medina sand at 3,964-74 ft. gaged 398,000 cu. ft. of gas natural and 750,000 cu. ft. 24 hours after shot.

The Foraker Drilling 3 Harry Gibbs, Section 35, York Township, Morgan County, will be completed as a small producer in the Clinton and a 400,000-cu. ft. gas well from the Medina sand. The Clinton was shot, but the Medina will be produced natural.

OHIO WILDCAT FAILURES

Coshocton County, Lincoln Township: Ohio Fuel Gas Co. 1 G. E. Clemens, Lot 8, Oriskany 3,088-96 ft., TD 3,119 ft.

Morgan County, Manchester Township: Wiser Oil Co. 1 Margaret Dye, Sec. 30, Clinton 5,044-47 ft. and 5,071-93 ft., Medina 5,176-95 ft., TD 5,205 ft.

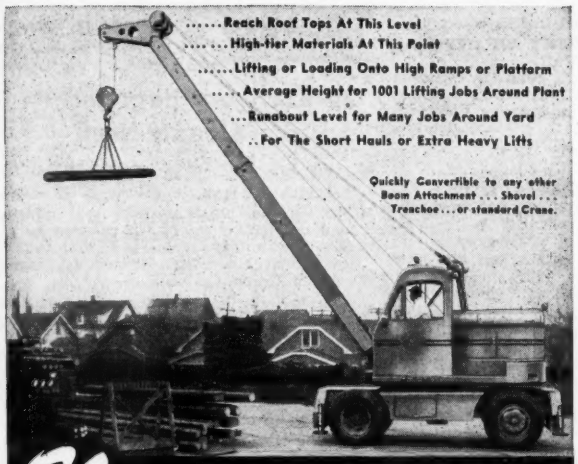
Union Township: Ohio Fuel Gas Co. 1 H. E. Grimes, Sec. 22, Clinton 4,390-4,438 ft., Medina 4,500-10 ft., TD 4,522 ft.

Stark County, Lexington Township: M. B. Belden Co. 1 I. Snode, Sec. 20, Clinton 4,800-82 ft., TD 5,041 ft.

EASTERN KENTUCKY

ASHLAND.—In Menifee County, 20-Q-72 Roy Davis et al at 1 Collingsworth topped Corniferous lime at 1,220 ft. and to a depth of 1,325 ft. had nothing showing. A wildcat for the area, it may drill on down to deeper sands before abandoning. Well is located in extreme southeastern portion of county and approximately 1½ miles east of Sam Birchfield test drilled some years ago.

In Johnson County, 19-R-79, Ashland Oil & Refining Co. 8 Wallace Williams is drilling at 3,794 ft. on a test of the Knox dolo-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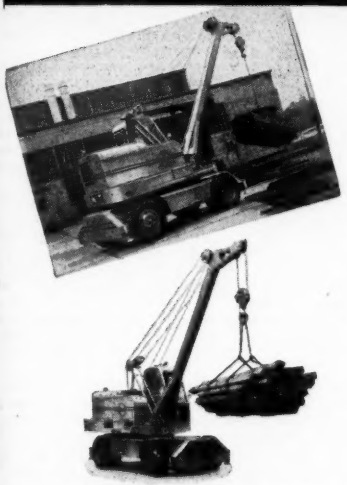

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EASTERN KENTUCKY WILDCAT FAILURE

Carter County: 24-W-79, Van Everman 1 Crawford, dry, TD 1,430 ft., Corniferous 1,321 ft., about ½ bbl. heavy black oil per day.

WESTERN KENTUCKY

OWENSBORO.—Daviess County has another prospective pool opener at C. E. Skiles 1 R. F. Kelly, SE SW NE 8-Q-31, about 10 miles northeast of Owensboro and about 3 miles east of production in Nantz pool in the northeastern part of the county. Operator is testing McClosky lime at 1,312-16 ft. The well is reported to have swabbed at the rate of 100 bbl. per day after a treatment with 1,000 gal. of acid. Elevation is 556 ft. and total depth is 1,317 ft. with 7-in. casing set at 1,200 ft. on top of the Ste. Genevieve.

In the Pellville area of Daviess County, Great Lakes Carbon Co. has completed 3-M Ann Pettit, 25-P-33, pumping 125 bbl. daily from the McClosky at 889-98 ft. Total depth is 1,001 ft.

In the Guffie area of McLean County, Miller & Shiarella and Ashland Oil & Refining Co. 5 Wright Brothers, 20-N-27, has been completed in the Tar Springs at 1,643-57 ft. and in Jackson sand at 1,885-95 ft. Production is estimated at 100 bbl. per day. Both Jackson and Tar Springs pays were shot.

George S. Engle has staked location for a wildcat in western McLean County at 1 James Grant, SE¼ 9-O-27, about 3 miles southwest of the town of Sorgho. The new location is about 4 miles southeast of the recently opened West Curdsville pool.

INDIANA

EVANSVILLE.—Southeastern Posey County has a new producing area with the completion of W. E. Witt and L. L. Blomgren 1 Walter Whitehead, NE SW NW 3-7s-12w, about 2 miles west of Heusler pool and about 7 miles west of Evansville. The well was completed in the McClosky at 2,708-12 ft. for 160 bbl. per day on pump. The new discovery well is about halfway between South Caborn and Heusler pools.

Carter Oil Co. has another prospective producer in the recently opened Spencer pool of southern Posey County. The well, Carter 4 Olive Hastings, NW NW NW 12-8s-14w, had a recovery of 150 ft. of oil and 30 ft. of oil-cut mud on a 3-hour drill-stem test of the McClosky at 2,850-77 ft. Casing has been set to 2,870 ft. The discovery well, NW SW NW of Section 12, was completed last November for 1,137 bbl. per day.

On the west side of North Vienna pool and across the line in Posey County, W. F. Lacy 1 Fred Pfettscher, NW NW SE 24-5s-12w, is showing for one of the better wells in the area. Operator has set casing for further tests of the Cypress sand at 2,315-25 ft. following a 1-hour drill-stem test at 2,310-25 ft. that had a recovery of 400 ft. of oil and 52 ft. of oil-cut mud. On latest report, the pay had been shot and crew was cleaning out.

Coy Oil Co. has a Benoist well in the Princeton area of Gibson County at 3 Charles Bury, SE NW SE 8-2s-10w. Crew continues testing after swabbing at the rate of 120 bbl. per day.

INDIANA SUCCESSFUL WILDCAT

Hamilton County: F. B. Cline 1 E. E. Brown, N½ NW SW 7-19n-4e, IP 10 bbl., Trenton limestone, 1,053-63 ft., TD 1,116 ft. (Discovery well for Brown pool).

INDIANA WILDCAT FAILURES

Posey County: Aurora Gasoline Co. 1 L. Record, SW SW NW 22-5s-13w, dry, 3,035 ft.

Ashland Oil & Refining Co. 1-A C. Dausman, NW SE NE 5-7s-1w, dry, 2,325 ft.

Vigo County: C. B. Mansfield et al 1 Fred McCullough, NE NE SE 19-10n-9w, dry, TD 2,248 ft.

Leo Light 1 Hill, NE SW NE 34-10n-9w, dry, TD 2,212 ft.

Alco Engineering Corp. 1 John W. Seaman, NW SW SW 13-11n-10w, dry, 2,020 ft.

LA.-ARK.

Oil Recovery Reported In Union County Well

SHREVEPORT.—Week's developments in wildcat operations in North Louisiana were routine, with no important changes noted on drilling reports. Arkansas gained three exploratory wells and reported oil recovery at Macmillan Petroleum Corp. 1 Nash, in Union County.

The 1 Nash, 35-18s-15w, cored a salt-water sand at 7,699-7,724 ft., and at 7,769-77 ft. the recovery was 8 ft. of porous oolitic lime with oil odor and spotted fluorescence. A drill-stem test from 7,763-77 ft., using ¼-in. chokes and 500 ft. of water blanket, flowed the water cushion, and had flowing oil in 12 minutes. According to report, it was not allowed to flow and recovery was 90 ft. of oil and 60 ft. of salt water. Bottom-hole flowing pressure was 2,250 psi. Oil recovered was around 40° gravity. It was coring ahead below 7,870 ft., with no further shows.

New operations were: McAlester Fuel Co. 1-A T. O. Giles, NE NE 6-18s-18w, Columbia County, where drilling was under way after setting surface casing. It is scheduled to 8,000 ft. Location is on a subsurface prospect, northeast of Atlanta field. New locations included: A. J. Slagter, Jr., 1 H. L. Berg, NE NE SW 29-13s-19w, Ouachita County; and Carter Oil Co. 1 T. F. Russell, SW NW 33-17s-16w, Union County.

In Bossier Parish, Barnsdall Oil Co. 1 Ardis & Co., 27-22n-11w, drilled past 8,952 ft. in the Cotton Valley. Bodcaw section was reported at 8,708-32 ft. S. M. Aronson 1 Stentell, 23-19n-14w, Caddo Parish, was drilling at 6,920 ft.

Hunt Oil Co. 1 J. H. Owens, new deep wildcat in 19-23n-6w, Claiborne Parish was drilling below 4,475 ft. Hunt 1 Smith, 10-23n-7w, was coring below 11,273 ft. H. W. Klein 1 Sims, 34-20n-5w, had a light blow with no pressure on a drill-stem test at 9,430-50 ft. Recovery was not reported. Operators were acidizing perforations at that interval. C. R. Schuster 1 Dance, 20-19n-6w, was drilling at 4,440 ft. It is a new Cotton Valley exploration, 3 miles southwest of Sugar Creek.

ARKANSAS WILDCAT FAILURES

Little River County: Lee & Burnett B-1 William Sivley, NE NE SE 35-12s-31w, dry, TD 3,483 ft., no shows.

Nevada County: J. M. Campbell 1 D. R. & Grace Sandusky, NW NE NW 8-11s-21w, dry, TD 1,942 ft., elev. 319 ft.

Carter Oil Co. 7 Core Test, NE SW SE 34-11s-20w, dry, TD 2,877 ft.

NORTH LOUISIANA WILDCAT FAILURE

Red River Parish: R. O. Roy B-1 Long Bell, SE NW 12-13n-10w, dry, TD 3,041 ft.

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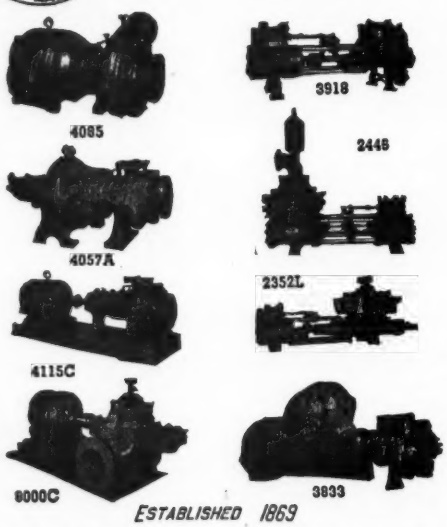

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Atlantic Refining Co. Met Consumer Demands

(Continued from page 57)

development of new, improved products and new uses for existing ones. Research to anticipate new industry trends assumed such importance that these activities were consolidated in a new division of the research department. Among other interests, this new division is engaged on work on fuels and lubricants for high-compression engines.

Increased demand for heating fuels, gasoline, and other products made necessary the acquisition of more tankage and handling facilities. Therefore, the company purchased the Uwchland, Pennsylvania, tank farm of the War Emergency Pipe Line (Big Inch), adding 1,200,000 bbl. of additional storage capacity. A new water terminal is under construction at Boston to provide economical transportation and increased supplies of products in the New England area.

Net earnings per share of stock in 1948 were $12.68 as compared with net earnings per share of $5.32 in 1947.

Plymouth Produced More Oil, Added to Reserves

INCREASED production, adding substantially to the company's crude reserves, was achieved during 1948, Plymouth Oil Co. states in its annual report.

W. S. Hallanan, Plymouth's president, commenting on the industry outlook, told the stockholders: "Our national security demands that we continue to be self-sufficient in petroleum resources. If another war should unhappily come to our shores, America must have an adequate supply of crude oil, and it must have that supply here at home.

"Equally important, it must have a free and healthy industry to produce, process, and transport that oil and its products. Nothing would be more perilous to our security than to become dependent upon foreign oil sources that would be inaccessible in time of war."

During the year Plymouth's production program resulted in new discoveries in Benedum field, Upton-Reagan counties, Texas, and in Tom Green County, Texas. The Benedum field discovery will add substantially to the company's natural-gas reserves. In order to utilize this gas, Plymouth is now constructing a plant in the field which will recover liquids and leave a dry natural gas for market. This plant, costing approximately $6,000,000, will be completed during 1949. It will have a processing capacity of 80,000,000 cu. ft. of casing-head gas per day. A contract has been completed with El Paso Natural Gas Co. for purchase of dry gas up to a maximum of 60,000,000 cu. ft. per day.

Drilling during the year accounted for 37 wells, which included 26 producers and 11 dry holes. At the end of the year Plymouth had a total of 498 producing wells. Offshore operations in the Gulf of Mexico by Melben Oil Co. in which Plymouth has a 25 per cent interest continued throughout the year. Two test wells are currently being completed in the area.

Republic Oil Refining Co., an affiliate owned 50 per cent by Plymouth, processed 11,180,934 bbl. of oil in 1948, an average of more than 30,000 bbl. per day, as compared with a throughput of 7,844,467 bbl. (21,490 bbl. daily average) in 1947.

Republic placed in operation during the year catalytic cracking units, gas-oil and gas-conservation units at the Texas City refinery purchased in 1947 from the Defense Plant Corp. Currently an alkylation unit is being converted to a polymerization unit to further process propanes and butanes for manufacture into a high-octane polymer for blending into gasolines.

Net earnings per share of stock in 1948 were $6.38 as compared with $4.01 in 1947. This does not include Plymouth's 50 per cent interest in Republic Oil Refining Co. which had a net income for the year of $3,481,829.

Panhandle Producing's Crude Output Increased

PANHANDLE PRODUCING & REFINING CO. increased crude production to 1,779,851 bbl. during 1948 with the acquisition of the properties of Wil-Tex Oil Corp. contributing substantially to that total, the company has announced in its annual report.

The crude production. which averaged 4,876 bbl. daily, compares with a daily average of 3,439 bbl. in 1947. Total net crude production in 1947 was 1,255,291 bbl.

During 1948 the company drilled 74 wells on leases in which it had a whole or part interest. These resulted in 59 oil wells, 5 injection wells, 2 gas wells, and 8 dry holes.

Crude runs to refineries at Wichita Falls and Lueders, Tex., were 1,705,398 bbl. (4,672 bbl. daily average) as contrasted with 1,596,699 bbl. (4,374 bbl. daily average) in 1947.

Construction under way at the Wichita Falls refinery will increase the daily throughput by 2,000 bbl., permitting manufacture of gasoline of higher octane rating.

Net earnings per share of stock in 1948 were $1.67 as compared with earnings per share of 55 cents in 1947.

Chicago Corp. Shared In Locating 85 New Wells

The oil and gas division of The Chicago Corp. had an interest in the drilling of 85 new wells during 1948, resulting in 23 oil wells, 9 gas wells, 4 dual gas wells, and 49 dry holes. At year's end the company had an interest in 120 oil wells and 249 gas wells. Additional drilling is in progress during the current year.

In 1948 the corporation, through a subsidiary, acquired an interest in a natural-gasoline plant in Conroe field in Texas operated by Midland Gasoline Co. Full operation of a pipe line owned by Triangle Pipe Line Co., another subsidiary, began in the latter part of 1948.

The Chicago Corp. during the year had gross sales of 2,600,460 bbl. of motor fuel, kerosene, and butane; 1,187,725 bbl. of crude oil and distillate, and 55,113,928 M.c.f. of natural gas.

Net earnings per share of stock in 1948 were $1.31.

Colorado School of Mines Schedules Oil Addresses

Several prominent figures in the oil industry will address technical sessions during Engineer's Day, an annual event held at the Colorado School of Mines, April 22-23. Featured speaker at this meeting will be Alfred M. Staehle, vice president, McGraw-Hill Publishing Co. Speakers from all branches of mineral industries will present papers at various sessions.

Petroleum papers on the program include:

"The Place of the Engineer in the Oil-Producing Industry," by A. L. Solliday, executive vice president, Stanolind Oil & Gas Co.; "Continental-Shelf Exploration Off Louisiana and Texas," by Dean A. McGee, vice president, Kerr-McGee Oil Industries, Inc.; "Geophysical Interpretation of Data in the West Texas Region," by Dr. M. M. Slotnick, supervisor of geophysical interpretation, Humble Oil & Refining Co.; "Regional Geography and Geology," by Dr. L. L. Nettleton, past president of Society of Exploration Geophysicists; and "Evolution of the Petrochemical Industry," by Dr. C. W. Perry, chief process engineer, Phillips Chemical Co.

Oil-Industry Tax Forum to Be in New Orleans April 18

Annual federal-tax forum of Mid-Continent Oil and Gas Association will be held at the Roosevelt Hotel in New Orleans April 18-19, according to an announcement by E. E. Hunter, Humble Oil & Refining Co., Houston, and M. J. Lasseigne, Arkansas Fuel Oil Co., Shreveport, chairman and vice chairman of the forum.

Hunter said that agenda of the forum will cover a review of developments in all federal-tax matters during the past year.

STATISTICS and

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED APRIL 2, 1949

	Total of all wells					13 wk.		Wildcat completions and discoveries										
													Cumulative total, 1949					
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	26	13	0	*13	27,841	299	362	0	0	0	0	0	0	0	0	0	0
Pennsylvania	38	17	4	†17	58,292	442	671	0	0	1	0	1	0	0	1	1	2
West Virginia	12	3	8	1	38,622	127	187	0	0	1	0	1	0	0	4	2	6
Ohio	19	4	2	‡13	51,363	273	287	0	0	0	4	4	1	0	1	12	14
Indiana	32	11	1	20	58,991	248	228	1	0	0	5	6	3	0	0	54	57
Kentucky	15	9	3	3	29,055	200	139	0	0	0	1	1	2	0	0	12	14
Illinois	37	17	0	‡20	87,079	485	440	1	0	0	7	8	8	0	0	79	87
Michigan	12	6	1	5	25,079	218	147	0	0	0	4	4	8	0	1	82	91
Kansas	47	27	3	‡17	147,718	676	606	1	0	0	7	8	12	0	2	89	103
Neb., Mo., Iowa	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
Oklahoma	80	50	1	29	261,112	867	869	2	0	0	11	13	35	6	5	125	171
Texas	244	143	11	90	1,015,803	3,101	2,495	6	1	5	48	60	107	8	24	527	666
North Central (Dist. 7-B & 9)	92	44	3	‡45	261,536	994	735	4	0	1	15	20	58	0	2	197	257
West (Dist. 7-C & 8)	51	45	0	6	253,863	683	674	0	0	0	3	3	12	0	0	41	53
Panhandle (Dist. 10)	7	7	0	0	21,490	268	129	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	11	8	0	3	64,178	167	125	1	0	0	1	2	1	1	2	26	30
Gulf Coast (Dist. 2 & 3)	39	19	4	16	254,484	459	404	0	1	1	13	15	19	4	13	104	140
Southwest (Dist. 1 & 4)	44	20	4	20	160,252	530	428	1	0	3	16	20	17	3	7	159	186
Louisiana	30	23	1	6	189,430	495	409	0	0	0	2	2	9	3	0	41	53
Northern	14	12	1	1	63,991	254	254	0	0	0	1	1	0	0	0	20	20
Southern	16	11	0	5	125,439	241	155	0	0	0	1	1	9	3	0	21	33
Arkansas	5	2	0	3	14,413	60	70	0	0	0	3	3	1	0	0	17	18
Mississippi	7	2	0	5	48,621	85	95	0	0	0	4	4	2	0	1	24	27
Southeastern States	1	1	0	0	11,585	14	10	1	0	0	0	1	1	0	0	12	13
Montana	3	3	0	0	4,974	44	56	0	0	0	0	0	1	0	1	5	7
Wyoming	8	5	0	3	41,275	132	97	0	0	0	1	1	5	0	0	24	29
Colorado-Utah	2	0	0	2	6,993	31	64	0	0	0	1	1	1	0	0	10	11
New Mexico	8	7	0	1	39,410	131	146	0	0	0	0	0	2	0	0	11	13
California	58	49	0	9	238,698	658	647	0	0	0	7	7	13	0	2	116	131
Total United States	684	392	35	257	2,396,354	8,587	8,025	12	1	7	105	125	211	17	42	1,244	1,514
Total previous week	681	400	36	245	2,533,446	7,903	7,406	25	2	2	98	127	199	16	35	1,139	1,389
Total April 3, 1948	619	352	45	222	2,243,258			11	1	3	79	94	168	17	65	1,110	1,360

Service wells included: *13, †17, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.96	....	....	....
19-19.9	2.07	....	....	....
20-20.9	2.17	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED MARCH 26

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	774	2,148	145	1,023	1,395	27,464	7,414	16,965	10,2[illegible]
Appalachian:									
District 1	82	281	42	90	84	2,799	381	691	[illegible]
District 2	68	272	26	49	102	1,264	126	203	[illegible]
Ind., Ill., Ky.	935	3,427	453	1,000	1,042	28,955	2,680	7,114	4,2[illegible]
Okla., Kans., Mo.	415	1,553	160	548	535	13,602	713	2,798	2,1[illegible]
Inland Texas	223	1,005	88	167	372	5,269	389	572	1,0[illegible]
Texas Gulf Coast	1,260	4,105	605	1,415	1,535	20,454	2,654	8,573	9,2[illegible]
La. Gulf Coast	455	1,329	318	572	415	5,808	1,976	2,909	2,5[illegible]
N. La. and Ark.	75	185	50	111	114	2,527	503	853	1[illegible]
Rocky Mountain:									
New Mexico	13	50	..	12	27	80	25	34	[illegible]
Other Rocky Mtn.	177	517	32	205	278	3,864	186	1,087	7[illegible]
California‡	876	2,545	95	975	2,406	16,001	653	6,922	27,2[illegible]
March 26, 1949‡	5,353	17,417	2,014	6,167	8,305	128,087	17,700	48,721	58,7[illegible]
March 19, 1949‡	5,335	17,470	2,169	6,775	8,411	127,310	18,226	50,099	¶59,[illegible]

*Finished and unfinished.† At refineries including natural blended. ‡Comparable data for 1948 on new basis not yet available. ¶Revised.

Bureau of Mines crude-oil stocks 266,506,000 bbl. as of March 26, down 837,000 bbl. One year ago 229,409,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas†	$2.65
Kettleman Hills, California*	2.64
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	[illegible]
Bradford, Pennsylvania	[illegible]
Eastern Ill. and Western Ind.†	[illegible]
Tomball, Texas Gulf Coast	[illegible]

*37°-37.9°. †35° and above.

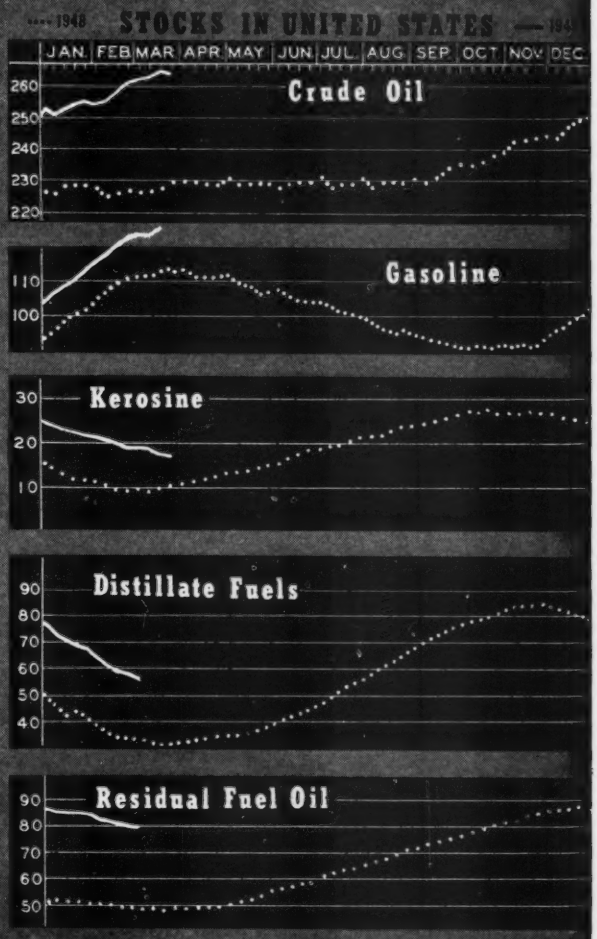
TRENDS

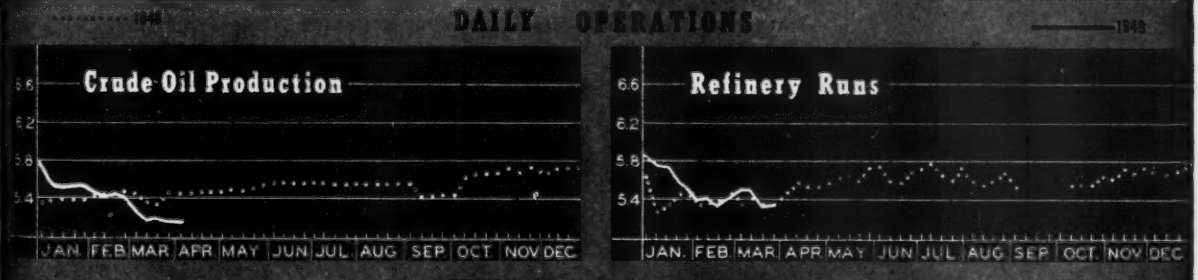
DAILY AVERAGE PRODUCTION FOR WEEK

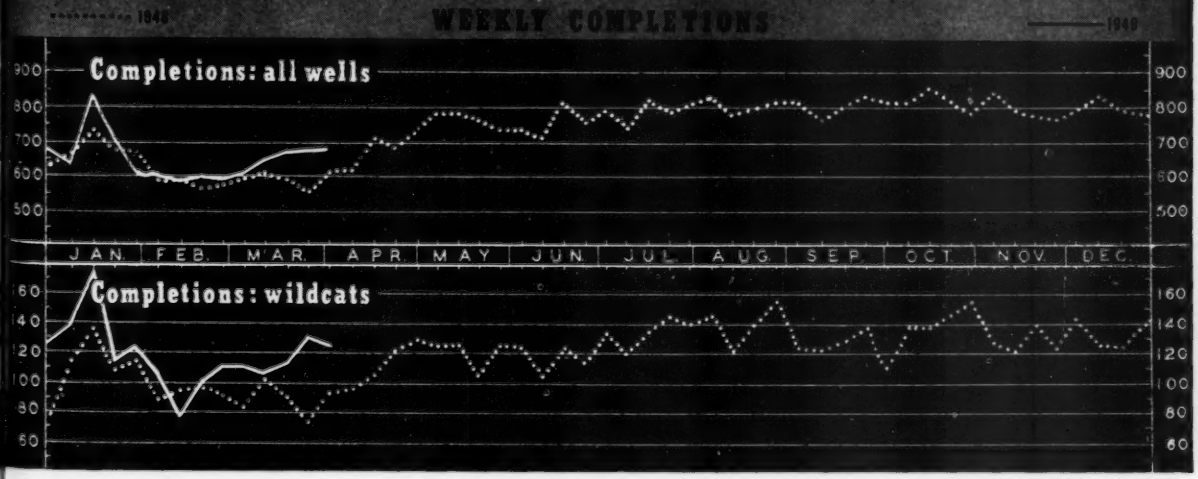
	April 2 crude oil	B. of M. Mar. demand	Mar. 26 crude oil
Alabama	1,200	1,700	1,250
Arkansas	80,100	84,000	81,550
California	950,200	950,000	951,000
Colorado	*61,400	53,000	60,700
Eastern	60,250	62,300	60,000
Florida	1,575	1,300	1,300
Illinois	174,200	167,000	172,600
Indiana	22,000	22,000	22,600
Kansas	296,750	290,000	297,600
Kentucky	23,600	22,000	23,100
Louisiana	490,050	475,000	489,225
North Louisiana	116,700	.....	117,350
South Louisiana	373,350	.....	371,875
Michigan	44,100	45,000	42,600
Mississippi	106,850	125,000	103,900
Montana	25,600	24,000	25,300
Nebraska	300	700	300
New Mexico	135,025	125,000	135,400
Oklahoma	398,750	412,000	398,150
Texas	2,066,025	2,400,000	2,127,925
Dist. 1 (Southwest)	26,325	.....	26,785
Dist. 2 (Southwest)	134,150	.....	139,425
Dist. 4 (Southwest)	198,950	.....	204,425
Dist. 3 (Gulf Coast)	395,150	.....	407,965
Dist. 5 (Eastern)	40,200	.....	42,050
Dist. 6 (Eastern)	93,825	.....	97,525
East Texas field	267,450	.....	273,000
Dist. 7-C (West)	45,750	.....	47,050
Dist. 8 (West)	593,000	.....	615,900
Dist. 7-B (W. Central)	60,100	.....	60,700
Dist. 9 (N. Central)	123,850	.....	126,000
Dist. 10 (Panhandle)	87,275	.....	87,100
Wyoming	130,100	140,000	125,200
Total United States	†5,068,075	5,400,000	5,119,700
Change from prev. wk., dn.	51,625		

Total production January 1-April 2 ..... ‡494,502,810 bbl.
Same period last year (crude plus cond.) ..... 502,776,255 bbl.

*Incl. 200 bbl. Utah production. †Not incl. 86,750 bbl. condensate. ‡Incl. 7,764,130 bbl. condensate.







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MARKETS

CONTINUED weakness in the market for selected petroleum products has resulted in spot reductions in the price of the base crudes for these products. Heavy crude-oil prices were reduced in California and in four fields of East Texas. Pennsylvania Grade crude was cut another 20 cents per barrel.

Increased capacity to produce lubricating oils and the unexpected drop in the demand for these oils have created a very soft market for most lubricants. In turn, the weak lubricating-oil market has been reflected in the lowered demand for premium crude oils used to manufacture lubricants. The end result is the fifth reduction in the price for Pennsylvania Grade crude in less than four months.

The refiners' big problem for almost a year has been residual fuel oil. Stock increases of almost 30,000,000 bbl. in 1948 brought heavy price cuts by the end of the year and continued weakness in the heavy-fuel market. These excess inventories have produced an unbalanced condition in the relative values of light and heavy crudes, resulting in spot reductions in the price for low-gravity crudes.

Standard Oil Co. of California announced a price reduction of 20 cents per barrel for residual fuel oil and at the same time posted lower prices for heavy crude oil. The new prices for California crude represent cuts ranging from 5 cents per barrel for 20°-gravity crude to 30 cents per barrel for 14° gravity. This latest reduction brings the price for 12-12.9°-gravity oil to $1.46 for most of the low-gravity fields compared with $2.16 after the last price increase near the end of 1947.

Talco Pipe Line Co. posted a 30-cent reduction in the price for asphalt crudes from four East Texas fields, effective March 29. The fields were Coke, Manziel, and Alba in Wood County, and Mitchell Creek in Hopkins County. The new schedule offers $1.80 for 19-19.9°-gravity crude with a 2-cent differential for each degree drop in gravity to 12° or below. Most of the crude has a gravity of about 14° or 15°.

Effective April 1, Joseph Seep Purchasing Agency of South Penn Oil Co. reduced by 20 cents the price offered for Pennsylvania Grade crude oil. This brings the price of Bradford crude to $3.55 per barrel.

New York Gasoline Advances

The season's first major rise in gasoline prices on the eastern seaboard came at the end of last week as Socony-Vacuum Oil Co., Inc., announced increases ranging around ½ cent per gallon for all grades of automotive and aviation gasoline. The advance was attributed to the recent ½-cent increase in gasoline prices in the Gulf Coast area, the principal source of supply for the East Coast.

Light heating-oil prices were drifting to still lower levels in New York Harbor in spite of recent reductions in the postings of major suppliers. Some of the smaller suppliers were cutting No. 2 prices to the market low of 7½ cents.

Refined-products markets in the Mid-Continent area continued sluggish as weather delayed the plowing season. Gasoline shipments have not increased materially but the general tone of the market is firmer and is marked by the absence of refinery-produced gasoline at the very low prices of last month.

Movement of gasoline on the Gulf Coast continued light, but some observers said they expected an increase in demand and a strengthened market. Price levels remained generally unchanged, but an "even weaker" trend was noted for light burning oils.

Representative Quotations

Representative spot-market quotations of leading suppliers as of April 4, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 73-75 octane	9⅛-9½	10.9-11.4	9¼-10
Premium gasoline, 78-80 octane	9⅞-10½	12-12.5	10¼-11
42-44 w.w. kerosine	8-8½	8.875-9.2	8¼-8¾
No. 2 straw fuel oil	7¼-7½	7.5-8	6¾-7¼
No. 6 residual	$1.00-1.10	$1.75-1.85	$1.35-1.45

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5	4½	4¾
Grade 18-55	6	5.4	5.7

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	11-13.5
750 vis., No. 3-4 neutral	14-16.5
2,000 No. 5-6 neutral	16-18.5

LUBRICATING OILS
Mid-Continent

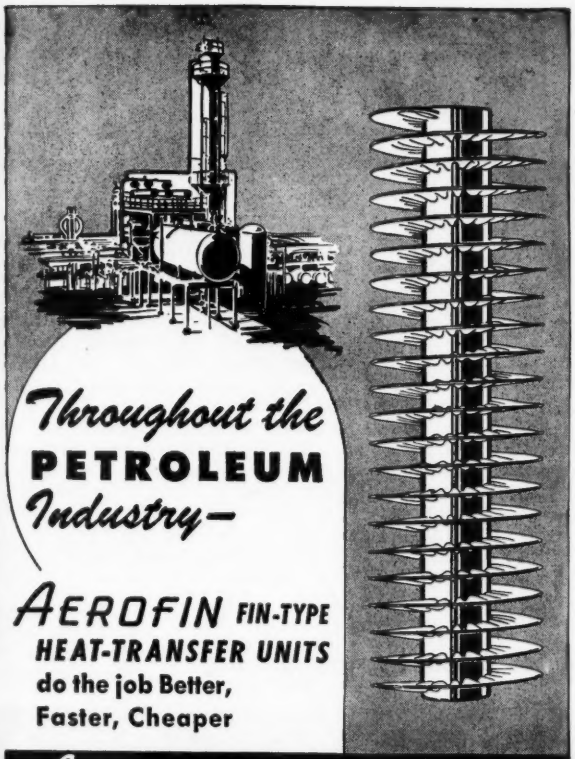
150-160 vis., D bright stock, 0-10 pp.	2
200 vis., No. 3 neutral, 0-10 pp.	1

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	23.5
180 vis., 0 p.t. neutral	22.5-25.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	



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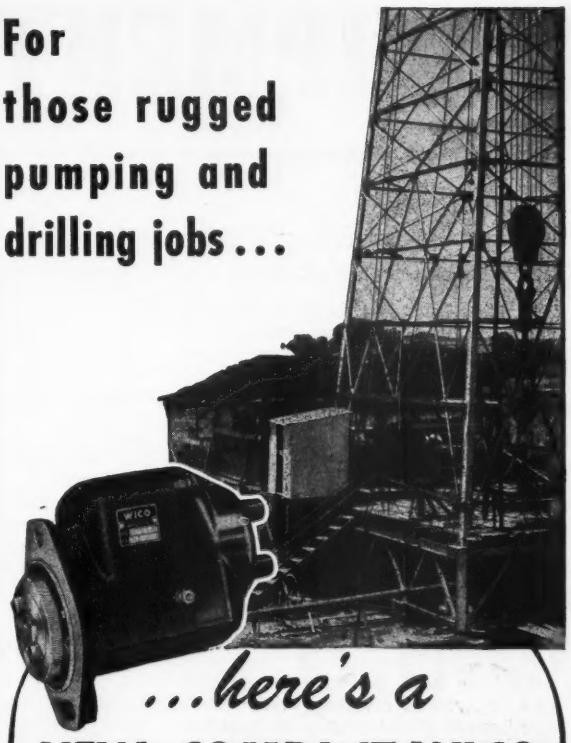


...here's a

NEW, COMPACT WICO heavy duty magneto

No matter how many hours of continuous service you need . . . no matter how much dust or dampness . . . your engine will get the regular, hot spark it needs from this WICO Model XHD magneto. It's a *new* magneto, designed to do the hard work you need done. It's compact. The molded insulated coil is stronger so there's less chance of breakdown. This solid plastic case is far tougher than a tape winding. A specially made bronze bushing and ball bearing, lubricated for life, insure trouble-free service. The large — 3/16" — tungsten contacts resist fouling, wear longer. Built-in impulse coupling. On flange-mounted models, a Buna-N oil seal prevents leakage. Available for 4 or 6 cylinder engines, flange or base mounted.

This *new* WICO Model XHD is the finest magneto available for engines operating in continuous service under the most adverse conditions that require ignition units of exceptional stamina and ruggedness.

If you've had ignition trouble, chances are this economical WICO XHD will change that. Ask your equipment dealer, or one of WICO's more than 2,000 authorized service stations. Wico Electric Company, West Springfield, Mass.

SINCE 1897
WICO
DEPENDABLE IGNITION

EQUIPMENT MEN ... in the News

Timken-Detroit Adds White And Heath to Sales Staff

Timken-Detroit Axle Co. announces the addition of two men to the personnel of its sales department. These

J. R. WHITE

C. M. HEATH

men have been assigned to the special equipment division. J. R. White has been engaged as a sales engineer and will be assigned to the Middle West territory. For the past 15 years, White has been employed in the engineering department of Diamond Truck Co. Carl M. Heath has been promoted to the position of sales representative. Heath has served Timken-Detroit for 8 years, both as a regional and service department representative. Both men will report to C. C. Bartell, divisional sales manager.

Additional Distributors Named by Diamond Chain

To make its roller chain, sprockets, and flexible couplings more widely available from stock, Diamond Chain Co. of Indianapolis has widened its coverage with the following additional firms appointed distributors: Akron, Ohio, Century Supply & Equipment Co.; Billings, Mont., Hines Bearing & Industrial Supply; Columbus, Ohio, Ross-Willoughby Co.; Toledo, Ohio, Ralph Shawaker Co.; Kalamazoo, Mich., Joseph E. Loughead Co.; Greenville, S. C., J. W. Vaughan Co.; Erie, Pa., Crossley Co.; El Paso, Tex., Mine & Smelter Supply Co.; Albuquerque, N. M., Harry Cornelius Co.

Black, Sivalls & Bryson Announces Several Changes

James R. Banks has joined Black, Sivalls & Bryson, Inc., and will be stationed at the New Orleans office. Banks is an experienced sales engineer, having recently been connected with Townsco Equipment Co. C. W. (Bill) Hayes, engineer at Kansas City, Mo., has taken temporary charge of the company's sales office in New Orleans. Hayes is an expert on the heater and treater needs of the oil industry.

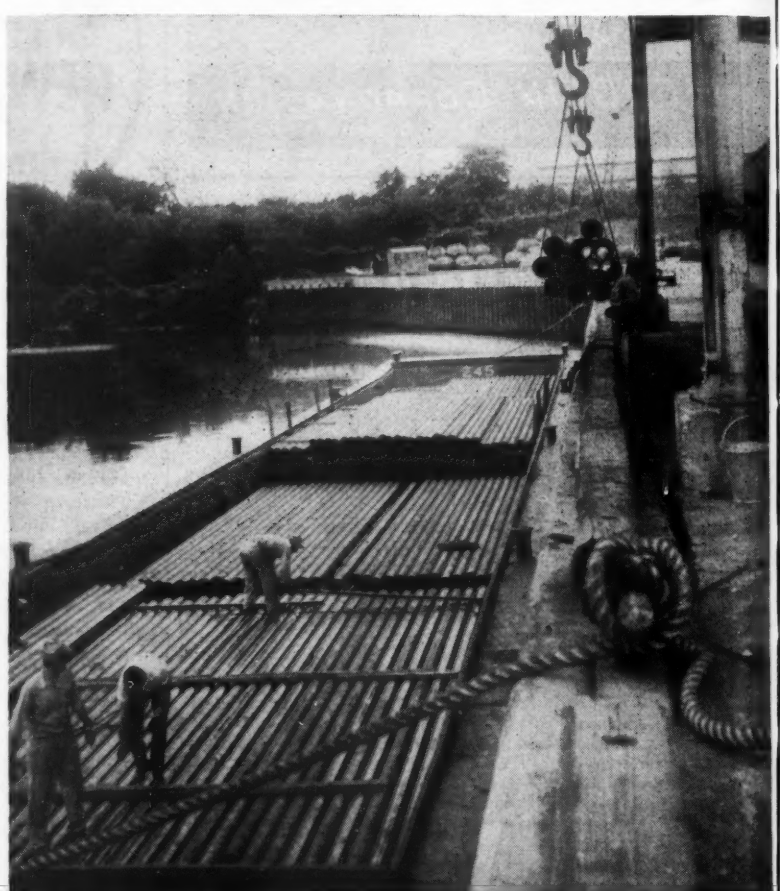
Floyd C. Myers, regional sales manager for Black, Sivalls & Bryson, has transferred headquarters from the company's branch at Lubbock to Midland, Tex., and John T. Cross, Jr., has been appointed branch manager at Hobbs, N. M. Prior to receiving this promotion, Cross was connected with the company's branch at Odessa, Tex. Benjamin W. (Bill) Bourne, sales engineer, has been transferred to the Midland sales office.

Cooper Appoints Ziegler To Sales Engineering

Appointment of James E. Ziegler to the sales engineering force of Cooper Alloy Foundry Co., Hillside, N. J., has been announced by Jack Victorine, sales manager. Ziegler will be stationed in Cleveland, in order to provide increased technical service to the Pittsburgh-Cleveland-Detroit areas.

A graduate of Purdue University, school of metallurgical engineering, Ziegler recently completed the extensive in-service training course at Cooper Alloy.

Unloading Pipe for Threading and Storing



Unloading a barge of pipe at Houston on Buffalo Bayou, above the turning basin, for Syd E. Culberston Co. of Houston. The pipe was shipped from Pittsburgh to Houston via the intercoastal canal. Culberston receives from 12 to 15 barge loads of pipe a year by water shipment for threading and storing at the company's pipe yards. The company also has a complete coating and wrapping service for line pipe

Goodall Appoints South American Representative

R. J. Goehrig, vice president in charge of sales of Goodall Rubber Co., Trenton, N. J., and G. E. Alvarado, vice president of the Pacific International Corp., New York City, recently announced that Pacific International Corp. has been appointed exclusive representative for the sale of Goodall products in the following countries of South America: Argentina, Boliva, Brazil, Chile, Ecuador, Paraguay, Peru, and Uruguay.

Williams to Sell Cathodic Protection for Dowell

GUY WILLIAMS

Sale of cathodic protection products for retarding electrolytic corrosion of pipe lines and industrial equipment has been transferred from the Magnesium sales division of Dow Chemical Co. to Dowell Incorporated, a wholly owned Dow subsidiary, according to an announcement by the parent company.

Guy Williams, assistant sales manager and a member of the Dowell staff for 12 years, heads the new sales activity, while Yale Titterington, a Dow corrosion and development engineer for 7 years and previously corrosion engineer for Northern Natural Gas Co., will handle technical-service aspects.

Keystone Tool Ready to Make First Deliveries

Keystone Tool Corp., after several months in the formative and plant-construction stage, is now delivering its own manufactured products out of Houston. Chief among the products is a field-tested slush-pump piston for which several advantages are claimed through simplification in design.

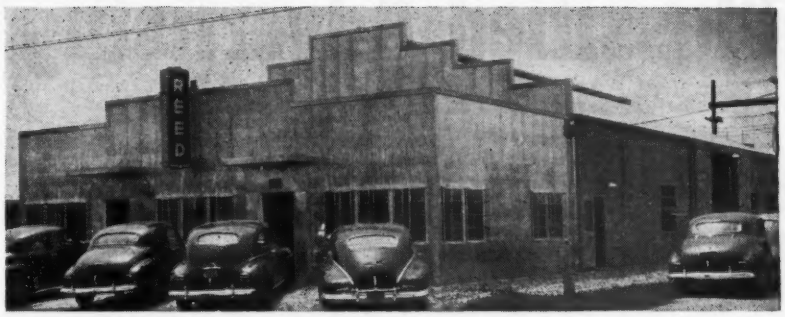
In addition to manufacturing its own products, Keystone represents Hamer Oil Tool Co., of Long Beach, Calif., which makes a line of plug valves and line blinds. Keystone was founded by C. K. Stillwagon, whose experience dates back to cable-tool operations in Pennsylvania and to the early development of West Texas fields.

Hercules Announces Personnel Changes

S. P. Tschappat, president, Hercules Tool Co. of Tulsa, announces two changes in personnel that have taken place recently.

A. W. Branscum has joined the company as field representative and will work out of the home office, spending much of his time in West Texas. Branscum was formerly an independent representative and prior to this was with the W. C. Norris Co.

Ivan L. Ingold has assumed the duties of assistant secretary-treasurer, filling the position recently vacated by Fred A. Anderson. Ingold was formerly with Pure Oil Co. and more recently with C. W. Titus Co., both of Tulsa.



Reed's New Service Plant at Houma

Reed Roller Bit Co. of Houston has just completed this new service plant at Houma, La.

Robert L. Gollum Joins International Cementers

International Cementers, Inc., has acquired the services of Robert L. Gollum as export representative in

JACK SMITH R. L. GOLLUM

South America and other overseas oil countries. Gollum is well known to the oil industry through his long association with Security Engineering Co. in California, Rocky Mountain, Midwestern and Mid-Continent fields.

Jack Smith, also of International Cementers, and Gollum have left for an extended trip to overseas locations. Both will go to Venezuela and will separate in Maracaibo, Gollum continuing through South America to Colombia, visiting oil operations in Quito and Guayaquil, Ecuador. Smith will leave Maracaibo for Trinidad and then continue to Europe. He will visit England, France, Holland, Turkey, Egypt, Saudi Arabia and Bahrain.

Sanford to Head Crane's Artesia, N. M., Branch

Crane Packing Co. has opened an office in Artesia, N. M., at 1204 Merchant Street with C. G. Sanford in charge. Sanford has been employed with Crane Packing Co. since 1947 and prior to this was associated with United Gas Pipe Line Co. and Superior Iron Works & Supply Co.

Pfeifer Given Lukens Steel Co. Promotion

Edmund Pfeifer, member of Coatesville district sales staff of Lukens Steel Co., has become assistant district manager of sales of the Boston office of the company, according to an announcement by J. Frederic Wiese, vice president in charge of sales. Pfeifer will assist H. G. Austin, who will continue as manager of sales in the Boston office.

Charles H. Pyle will take over the territory in York and vicinity formerly handled by Pfeifer. Pyle will continue to operate out of the Coatesville district sales office.

Kemp Board Elects New Officers and Directors

At the recent meeting of the board of directors of C. M. Kemp Manufacturing Co., J. C. Kimpel, formerly secretary and treasurer of the corporation, was elected president and chairman of the board, succeeding the late Wallace W. Kemp.

Edward J. Funk, Jr., was elected vice president and will continue in his capacity as chief engineer. Charles E. Wilbur, formerly assistant secretary and treasurer, was elected secretary and treasurer. Wilfred G. Keir was added to the board of directors.

(Continued on page 151)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FORT WORTH Super-N and Model-N Spudders with tools. Very good condition. Can drill 1500 feet. C. S. Turet, Box 206, Great Bend, Kansas. Phone 5062 or 6624.

FOR SALE: Ex-warehouse, new seamless A.P.I. internal upset drill pipe, approx. 16,000 ft. 5½"-21.90, 500 ft. 3½"-13.30 and 4,000 ft. 2⅞"-10.40. Write: Box C-846, The Oil and Gas Journal, Tulsa, Oklahoma.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO.
3415 Westminster, Dallas 5, Texas

FOR SALE

3713 feet 9⅝ O.D. 40.8# Seamless Oil Well Casing. Run in well but in excellent condition. Priced to sell.

1—125 H.P. 350# Working Pressure "Oil Well Boiler," completely reconditioned and in excellent condition. State inspected. $2250.00 our yard, Okla. City.

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Okla.

RECONDITIONED SEAMLESS TUBING

85,000 ft. 1½" O.D.
120,000 ft. 2" O.D.
55,000 ft. 2¼" O.D.
75,000 ft. 3¼" O.D.
80,000 ft. 4" O. D.
21,000 ft. 8⅝" O.D.

Single or Double Random Lengths—Plain Ends.
Beveled for Welding.
Approx. 10 Ga. Wall.
Ideal for oil and gas lines.

Sonken-Galamba Corp.
2nd and Riverview (X-425)
KANSAS CITY 15, KANSAS
THatcher 8243

EQUIPMENT FOR SALE

One type "E" Allis-Chalmers Double Pole Tractor Unit. One type "HM" Allis-Chalmers Single Pole Tractor Unit. P. O. Box 3246, Corpus Christi, Texas.

FOR SALE: Model "K" Cardwell, single drum draw works powered by G.A.K. Waukesha engine. Equipped with 90' "A" mast and sub skid. Priced for quick sale. Terms. Melton Supply Co., Seminole, Okla.

FOR SALE—Cardwell Draw Works, Model "L"—Air Clutches—A-1 Condition. Box 3246, Corpus Christi, Texas.

FOR SALE: Wilson Giant draw works, powered by 2—J.L.-1335 Buda engines and Wilson chain compound. Like new condition, with bargain price. Terms. Melton Supply Co., Seminole, Okla.

BULL WHEEL SHAFTS: 4000' 16" O.D., ½" Wall; 18" O.D. ⅝ and 1⅛" Wall, 9 to 12 foot lengths. Degen Pipe & Supply Co., Box 107, Red Fork Station, Tulsa, Oklahoma.

DRILLING IN Units—2 Complete Beam Type Units with A frame masts and 5" Tools. One with WOK Waukesha; other has D 13000 Caterpillar. Beardmore Drilling Company, 603 Petroleum Bldg., Wichita, Kansas.

PIPE MACHINE FOR SALE
One Bignall Keeler motor driven Pipe Machine in good condition. Threads pipe from 2" to 6". Dies included up to 6". Oil Field Salvage Company, Box 1362, Odessa, Texas.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

1947 Beechcraft Bonanza, good condition, 550 hours on plane and motor. Has in addition to regular equipment, an A. D. F. radio, gyro compass, attitude gyro, 3 three-minute flares, seat covers and a plastic propeller. Will trade for petroleum products or sell for cash.

Box C-840

The Oil and Gas Journal
Tulsa, Oklahoma

FOR SALE

NEW CASING AND LINE PIPE

25,000'	5½" 15½# 8RT J55 R2 API Smls. Casing
15,000'	7" 23# 8RT J55 R2 API Smls. Casing
6,000'	8⅝" 28# 8RT J55 R2 API Smls. Casing
4,641'	9⅝" 36# 8RT J55 R2 API Smls. Casing
7,015'	10¾" 40½# 8RT J55 R2 API Smls. Casing
19,000'	(893 Joints) 6" Std. Byer's Wrought Iron L.W. Plain End Pipe (ASTM A72-33)

Above subject to prior sale.
THE NATIONAL COOPERATIVE REFINERY ASSOCIATION
P.O. Box 770 McPherson, Kansas
Phone 620

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000'—Respooled for Your Inspection—Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: Used, Franks single jackknife derrick, Franks traveling block and hook. Franks slim hole rotary with 3¼, 4½, and 5 inch slips. Equipment in excellent condition and formerly used on Franks 3000' slim hole rig. Box 70, Duncan, Okla. Phone 522.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

PIPELINE Construction Equipment for Sale: One spread, suitable for work up to 12", very reasonable. C. W. Sternberg, 8230 Wier Drive, Houston 17, Texas. Phone Preston 7043.

FOR SALE: Combination Rotary and Spudder. Have been drilling 1980 ft. production. 1—P.A. 100 International Motor. Rig and motor are in perfect shape. Ready to start making hole, either rotary or cable tools. Terms. F. T. Wolfe, 1716 11th St., Wichita Falls, Texas.

FOR SALE: One No. 10 Unit Rig Draw Works with Two D13000 Caterpillar Diesel Engines Compounded. Equipment in good shape. Kiowa Drilling Company, Inc., 717 Union National Bank Building, Wichita 2, Kansas. Phone 3-8013.

FOR SALE: Complete Natural Gasoline Plant and gathering lines. Located near Bristow, Oklahoma. Entire unit or part. Victor Gasoline Company, P.O. Box 1733, Tulsa, Oklahoma. Phone 2-5263.

FOR SALE: 10,000 ft. 20" OD x ¼" Wall New Electric Weld Steel Pipe, Double Random Lengths; 50,000 ft. 18" OD x ¼" Wall Used Steel Pipe, Single Random Lengths. Utility & Industrial Supply Company, 911 Michigan Ave., E., Jackson, Michigan.

SHOT HOLE drill, on 1941 Ford truck. Hyd. lift mast, chain pull down, 3" kelly, 4½ x 6 G.D. pump, twin disc clutches. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

STEEL STORAGE TANKS

Railroad Tank Car Tanks
6,500 to 12,000-Gal. Cap.
Coiled and Non-Coiled
Cleaned—Painted—Tested
Heavier—Safer—Cheaper
Other Tanks Too
Also—Complete Tank Cars
8,000 and 10,000-Gal. Cap.

Your Inquiries Solicited

NEWHALL-MARSHALL-WOOD, INC.
30 Church Street, New York 7, N. Y.
Phone: COrtlandt 7-8090

FOR SALE

DIESELS AND PUMPS

3—New unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, one connected to Ingersoll-Rand Multi-stage Centrifugal Pump with Farrell-Birmingham Step-up Gear and two connected to Worthington Horizontal Triplex Double Acting Pumps, all units complete with Falk couplings, Lummus Coolers, other accessories. Location Ohio, immediate shipment. Direct inquiries to

THE BUCKEYE PIPE LINE COMPANY
Joseph Steele, Purchasing Agent.
Room 2200, 30 Broad St., New York 4, N. Y.

EQUIPMENT FOR SALE

7,000 FEET 2⅛" threaded and coupled black line pipe excellent condition twenty foot random lengths, reasonable price. K. W Porter Box 598, Effingham, Ill. Phone 207.

GOOD USED STEEL lapweld casing, tubing, and line pipe for sale: 4,000 ft., 7" O.D. 17 lb., 10-V Thread—$1.10 foot; 8,000 ft. 5½" O.D. 13 lb. 11½-V Thread—$0.82 foot; 1,800 ft. 8⅝" O.D. 24 lb., 8-V Thread—$1.60 foot; 20,000 ft. 2⅜" 4.50 Wt. tubing, upset and regular—28c foot; 50,000 ft. A-1 used 2⅜" 3.75 Wt. line pipe, shopped, ready to lay, 18c foot; 75,000 ft. used line pipe "as is," not shopped, 12c foot. Rigs, belts, pumping and drilling engines, tanks, everything for your wells. TRI-STATE Oil and Gas Company, Box 827, Parkersburg, West Va.

FOR SALE: Bucyrus-Erie 36L Spudder with A-Frame mast, air brakes, special axle, tires, fifth wheel, complete. Used on a clean-out job only, and is same as brand new. Located near Pittsburgh, Penna. Write Producer, 43 Grant Avenue, Pittsburgh 23, Penna., or phone STerling 4600.

FOR SALE: Double drum heavy duty spudder, 6500 foot capacity, with telescoping mast with roller bearing sheaves, all mounted on steel skid. All tools for 7" and 5" casing, Kohler light plant, unitized forge on skid, large skid rack for moving all tools. Machine and tools in excellent shape. Everything rigged for quick moving. Ready to put to work. Price $12,500.00. Box C-857, The Oil and Gas Journal, Tulsa, Oklahoma.

USED OIL FIELD ENGINES, POWERS, Tanks, Casing, Rods, Shackle Irons. A. K. Cline, Phone 664, 501 Peoples Bank Bldg., Marietta, Ohio.

FOR SALE: 3½" and 4½" good used Drill Pipe and Tool Joints for drilling purposes, at reasonable prices. The National Supply Company, Fort Worth, Texas.

FOR SALE: One Sullivan Core Drill equipped for water well drilling. Paul Hardy, 800 Camino de las Marquez, Santa Fe, New Mexico, Phone 3368-J.

1—140 CLEVELAND Ditcher with 22" Buckets, 1 Extra set stripping buckets, 1 TD-9 Side Boom, 1 Cleaning Machine with spare change over parts and dollies, 1 Pipe finder, 1 Generator, 1 Beveling machine, 1 Power pipe straightener, 1 10-Barrel Heating Kettle, 2 International Trucks and other miscellaneous equipment. McCall & Sebastian, Phone 290, Drumright, Oklahoma.

6" STD. SEAMLESS PIPE

16,000 ft. 6⅝" OD 18.97# Grade A Seamless 1500# Test Line Pipe, 40' DRL, ends beveled. Used, excellent condition, available prompt shipment Dodge City, Kansas.

HORWITZ PIPE & STEEL CO.
Ph. 2-9128 Tulsa, Okla.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units Repair Service and Parts

OKLAHOMA MACHINE & SUPPLY CO
Ada, Oklahoma

FOR SALE

3200' 5 9/16" 22#, Range 2 drill pipe with Reed shrink grip full hole tool joints. Pipe and joints in A-1 condition. Priced right.

Two 110 H.P.—250# W.P. Oilwell locomotive type boilers. Boilers practically new—used only a short while. Can be operated at full pressure. Priced right.

Phone 3957 P. O. Box 1517
Pampa, Texas

EQUIPMENT FOR SALE

FOR SALE at Oklahoma City: 3 Used 9½"x14" Type VTH Clark Compressor Cylinders for vertical engines. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: 1 Model K Cardwell Double Drum Draw Works with rotary table drive and transmission assembly, American cathead. 2 D13,000 Caterpillar engines. 1 Type FE 12½" National Rotary Table. 1 3½" Kelly. 2 3½" Drill Collars. Misc. 3½" Drill pipe slips, Kelly bushings, and drill pipe subs, all in first-class condition, located our McPherson, Kansas, yard. Veeder Supply & Development Co., Cherryvale, Kansas.

FOR SALE: At our Lacy Gasoline Plant, Section 14-8-6, Seminole County, four 4-Room houses to be moved. $2,000.00 each. Contact G. F. Downs at plant or write Cities Service Oil Co., Patridge, Bartlesville, Okla.

NEW CENTRIFUGAL PUMPS

Byron Jackson—Aurora—Lombard—Gould—Hale—Gorman Rupp—Wayne & Novo, complete with engine power, also 1½ to 20 KW light plants. H. A. McCarthy, 310 Thompson Building, Tulsa, Oklahoma.

FOR SALE

4" Black Pipe
4½" O.D. x .203 wall
8,000 ft.

Grooved ends for victualic couplings. 75c per ft.

WALLACK BROTHERS
7400 S. Damen Ave., Chicago, Illinois

FOR SALE IN STOCK, Quick Delivery: New Welded Steel Tanks and bolted; Used welded and bolted Steel Tanks, for Oil, Water, Gasoline, Grain, etc. Tool Houses, any size, built ready to go. Call or write.

INDEPENDENT TANK CO.
Phone 977, Box 102 Seminole, Okla.

FOR SALE
ANGLE TYPE GAS ENGINES

1—Cooper Bessemer GMV-800 HP Engine, Less Compressor Cylinders.

3—Cooper Bessemer GMR-300 HP Engines. Each Engine with 3—8¼" x 14" CA Double Acting 75-175 PSI Suction, 500 PSI Working Pressure Compressor Cylinders. Engine capacity 75-500#, 2,700,000 cubic feet per day; 175-500#, 4,750,000 cubic feet per day, equipped with clearance pockets.

All Engines with Water Pumps, Air Filters, Oil Coolers, Mufflers, and Safety Devices.

All in excellent condition.

Location West Virginia. Available for immediate delivery.

Direct inquiries to W. S. MOORE, P. O. Box 873, Charleston, W. Va.

FOR SALE

3—Ingersoll-Rand centrifugal pumps, No. 12 A.L.V., single stage, bottom double suction, volute type, horizontally split casing, bronze fitted, 5000 GPM, 180 ft. hd. at 1200 RPM, direct connected with flexible couplings and mounted on common bed plate, to Westinghouse 300 HP, 2300 V, 3 ph., 60 cy., 80% power factor synchronous motors with direct connected exciters, complete with panel mounted full magnetic, full voltage GE CR 7065 starting equipment, mounted in a NEMA type 1 cabinet

Large Quantity 4" and 6" Crane 33 X 300 lb. new steel gate valves, OS & Y, flanged.

Inquiries invited for any refinery equipment.

ACME OUTLET CO.
3904 Prospect Kansas City 4, Mo.

EQUIPMENT FOR SALE

FOR SALE: Lubricating Oil Canning Equipment, 1 Six-pocket Sprague-Sells Quart Can Filler, 1 Standard Knapp Booster Elevator and Boxer, 1 Empty Can Feeder and Motor, Good condition, taken out of service January 1, 1949. Located at Cyril, Oklahoma. As is, where is, $2,500.00. Anderson-Prichard Oil Corporation, 1000 Apco Tower, Oklahoma City 2, Oklahoma.

FOR SALE: 1 Double Drum Cardwell Spudder, 145 H.P. Waukesha Motor, rotary attachment, complete with tools, wire lines, doghouse, Kohler Light plant, steel derrick, ready to go. Priced to sell. Fox Well Servicing Co., Box 488, Healdton, Okla.

FOR SALE: 200 feet 5½ inch new T&C, R-3, 15# J-55 Seamless Oil Well casing, $2.00 per foot on rack.
COOPER-HEMPHILL OIL COMPANY
HALE CENTER, TEXAS, PHONE 4721

FOR SALE

24" and 28" I.D. Used Pipe
Suitable for Water Well Casing, Conduit or Road Crossing
¼" Wall and Heavier
3c per lb. F.O.B. Houston

STANDARD OIL FIELD SUPPLY CO.
P.O. Box 243 HOUSTON, TEXAS
Phone C 4-6976

STEEL STORAGE TANKS

12—55,000 BBL.
2—18,000 BBL.
1—17,500 BBL.
1—15,000 BBL.
7—5,000 BBL.

HORWITZ PIPE & STEEL COMPANY
P. O. Box 2534, Tulsa, Okla.
Phone 2-9128

EQUIPMENT WANTED

WANTED—TOOL JOINTS
Require 100 E.U.I. F. tool joints to replace worn Reed joints on 18# Range 3 full hole 4½" Drill pipe.
MACHINERY DEPOT LIMITED
Calgary, Alberta, Canada

WANTED: 3½" OD or 4½" OD used drill pipe, 3½" OD line pipe or tubing. SCHAFER PLOW, INC. Box 578, Pratt, Kansas. Atten.: J. L. Crowder.

WANTED: Oil field salvage and scrap; abandoned leases, strippers; used tubular products, dead lines. Industrial plant and lease dismantling a specialty, full coverage. HIGHEST PRICES PAID. ROZEN IRON & METAL CO., MAUD, OKLAHOMA. Write P.O. Box 686. Phone 330.

WANTED

Five 12 x 12 Cylinders for XOB Ingersoll-Rand Compressors

THE DRILLERS GAS COMPANY
Union National Bank Bldg., Wichita, Kansas
Phone 3-1228

FOR SALE

SMALLEST, Prettiest, Miniature Tri-Cone Rock Bit made. Less than one-half inch diameter. Cones turn. Gold or Nickel plate. On tie chain clasps, strap type for watch fobs and ring type for charms. $5.00 each Money Order or C.O.D. H. McGaughey, P. O. Box 11063, Houston, Texas.

ALUMINUM PAINT—400 5-gallon cans, 480 quarts—Exterior Gilsonite Base, Highly Polished Pure Aluminum Pigment. Waterproof, ideal for tanks, roofs, buildings, equipment. Covers 300 to 400 square feet to the gallon. Distributors Liquidation. Regular price $6.95 gallon. Take any part—$10.00 for 5 gallons, $7 for 12 quarts. Send Check With Order. The National, 606 Walnut, Kansas City, Mo.

HELP WANTED

CORROSION ENGINEERS
Graduate Engineers, under 30, two or more years' experience in survey and installation work on pipe lines. Sohio Pipe Line Company, P. O. Drawer D-15, St Louis, Missouri.

GEOPHYSICIST with experience in West Texas for interpretation work with major oil company. Permanent location. Box C-856, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED and rounded Land Man for large company, preferably with Texas experience. Age limit 45 years. Inquiries will be treated confidentially. Box C-801. The Oil and Gas Journal, Tulsa, Oklahoma

OLD and established manufacturer of oil well production equipment wants full time representative for Gulf Coast territory, with headquarters in Houston. Salary, traveling expenses and car allowance. Require high class man. State age, experience, whether married or single, give references. Box C-851, The Oil and Gas Journal, Tulsa, Oklahoma.

GRAVITY PARTY CHIEFS: We have several attractive openings in domestic work for experienced and well qualified Party Chiefs. Best opportunities in the industry Box C-804, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER

Diesel engine distributor on Louisiana Gulf Coast needs young, experienced salesman to contact major companies, supply houses and contractors. Write stating qualifications.

GEORGE ENGINE CO., INC.
GM Diesel Distributor
P. O. Box 10054, New Orleans, La.

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

WANTED: Machinist Foreman. Ten years supervisory experience in engine maintenance and machine shop practice. Familiarization with oil refinery machinery desirable but not essential. Write giving training, experience, references and personal details to: The Carter Oil Company, P.O. Box 2094, Billings, Montana.

WANTED—PUMP SALES ENGINEER
Must be familiar with the types and makes of Centrifugal and Reciprocating pumps used in the Refining and Process industries and experienced in the selection and application of this type of pumping machinery to meet the requirements of these industries. Position includes selection and application of centrifugal and reciprocating pumps, estimating, handling sales correspondence and sales development work in our Indianapolis Sales Department. Please give detailed description of qualification and experience listing positions held with previous employers. All replies will be kept in strictest confidence.

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Address Box C-847

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

SITUATIONS WANTED

GEOLOGIST wants position with ACTIVE independent or individual desiring to enter the oil business. Experienced in development; exploration, including surface and subsurface geology, gravity and seismic interpretation; developing and executing drilling deals; and leasing. Capable of directing exploration campaign and passing on deals submitted. Have worked in most producing states of south and southwest, and have wide acquaintance among oil men and geologists of these areas. Prefer to work on salary-plus-interest basis. Additional information if interested. Write Box C-850, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

OUTSTANDING POSITION OPEN

Engineer to direct Sales of Refinery process units. Qualifications to include sales and process engineering experience with major oil companies or petroleum engineering and contracting firms. Knowledge of oil refining process engineering plus economic evaluations and applications necessary. Age 35 to 45 years. Excellent compensation—salary and bonus. Location—New York or Tulsa. When replying state educational and experience background. Our own employees notified of opening.

Address: Box Number C-860, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

ACCOUNTANT: 8 Years experience in all phases of accounting, office and tax work with independent oil operator. Desire change with opportunity for advancement. Age 33, B.B.A. degree. Box C-844, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Age 36. Experienced Mid-Continent and Rocky Mountains as executive and production superintendent in all phases oil field operations including leasing, evaluations and negotiating drilling deals. Capable full responsibility for drilling, completion and production. Some geology. Desire responsible connection with active organization. Domestic or foreign. Box C-842, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE ENGINEER
Thirteen years graduated, all-round oil field experience. Four years supervisory and administrative in drilling and production. Linguist. Age 35. Desire connection domestic or foreign, $9,000 minimum base. Box C-852, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, BS, MS, experienced domestic and foreign, over 5 years principally development and workover geology, year university teaching, 3 years practical oil field work. Box C-853, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED in Plant Process and Qualified Electronic Service Engineer desires Instrument Work with Refinery or Instrument Organization. Box C-854, The Oil and Gas Journal, Tulsa, Oklahoma.

CRUDE OIL EXECUTIVE
Now With Major Company Desires Make Change. Box C-859, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE ENGINEER, B.S. in Engineering Physics, one year's production experience, three years' experience in oil accounting. Desire work as Petroleum Engineer in production or reservoir analysis. Box C-858, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER
Excellent record in management and accomplishments. Highest personal, professional, and experience qualifications. Age 44. Available reasonable notice. Box C-862, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM CHEMIST: Age 31, eight years experience special physical inspections and chemical analyses associated with petrochemical research, new product development, and refinery process service, including staff supervision. Familiar with refinery control tests. Engineering degree background. Box C-855, The Oil and Gas Journal, Tulsa, Oklahoma.

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SANDOVAL, ILLINOIS
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San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington New Mexico.

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Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

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LEASE AND DRILLING BLOCKS

LEASE: for drilling contract, 750 acres in Pontotoc Co., within three miles of production. Box C-861, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and gas leases and drilling propositions in shallow territory Northwest Colorado, Southern Wyoming, and Southeast Utah. Depth of drilling, 400 to 2500 ft. S. Marvin James, Meeker, Colorado. Phone: Meeker 4.

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FOR SALE or will lease for oil: 27,000-acre ranch, very nice, modern improvements, ample water by wells and springs. Carrying capacity 800 to 1,000 cows and calves. The price, $18.00 per acre with ½ minerals. Good terms. Possession now. Write: Guy Speakman, 1326 East Kiowa, Colorado Springs, Colorado.

TENNESSEE—88,000 acres timber land—$3.50 per acre, all minerals included. Details: Earl Jester, 12744 Vanowen, North Hollywood, Calif.

GEOLOGIST with extensive knowledge of good oil plays in Wyoming and adjacent states wishes contact with individuals or company willing to go "all out" on an exploratory and wildcat play on a share basis. Cite specifically, who you are, references and financial backing. Write Box C-848, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL LEASES for sale in large, small or medium size blocks in Colorado, Wyoming, New Mexico, Montana, Arizona. Wholesale or retail. Write for descriptive list. Dyer-OJ, 1835 Champa, Denver, Colorado.

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Equipment Men

(Continued from page 147)

Harnischfeger Diesel Headed by Schoeppner

A number of years ago, when Harnischfeger Corp. decided to enter the diesel-engine field, Karl P. Schoeppner, general manager of the diesel division was placed in full charge of the development.

Schoeppner obtained his diesel engine experience in one of the largest internal combustion engine manufacturing plants in Europe. Upon coming to the United States, he joined, first Murphy Diesel Co. and later, Waukesha Motor Co. His major interest was to develop a light-weight, small, high-speed diesel of all-welded construction which Harnischfeger now makes.

Thomson Made Director For Dresser in Canada

A. M. THOMSON

H. P. Boncher, vice president of Dresser Manufacturing Co., Ltd., Toronto, announces the appointment of Alex M. Thomson as managing director. D. B. McWilliams, formerly managing director, submitted his resignation to devote his entire time to the operation of McWilliams-Beardmore Mines, Ltd.

Thomson has been employed for the past 2½ years as sales engineer for Dresser Manufacturing Co., during which time he has called on customers in all provinces. He will continue to give his personal attention to all field problems in sales and engineering.

Geolograph Co. Opens Baton Rouge Office

Geolograph Co., Inc., of Oklahoma City has opened a district office in Baton Rouge, La., with R. G. Wise in charge. The new office is under the supervision of M. L. Jackson, located in Shreveport, La.

The company also announces that A. J. Shorney and L. W. Streeter have been added to the staff of Geolograph at Oklahoma City. Shorney has been appointed head of the sales department for the Oklahoma City division. Streeter has been appointed assistant to H. T. Brown, manager.

CALENDAR OF EVENTS

April

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, Cincinnati, Ohio, April 11-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Mid-Continent Oil and Gas Association, annual federal tax forum, Roosevelt Hotel, New Orleans, April 18-19.

Midwest Power Conference, annual meeting, Hotel Sherman, Chicago, April 18-20.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss. April 20-22.

American Geophysical Union, annual meeting, National Museum, Washington, April 20-22.

American Geophysical Union, regional meeting, Denver, April 26-27.

Petroleum Industry Electrical Association, Petroleum Electrical Supply Association, annual convention, Mayo Hotel, Tulsa, April 26-28.

American Petroleum Institute, eastern district, William Penn Hotel, Pittsburgh, Pa., April 27-29.

Society of Automotive Engineers, Engineering Societies Building, New York, April 28.

May

American Society of Mechanical Engineers, spring meeting, Mohican Hotel, New London, Conn., May 2-4.

Independent Petroleum Association of America, midyear meeting, Roosevelt Hotel, New Orleans, La., May 3-4.

American Petroleum Institute, division of marketing, midyear meeting, Jefferson Hotel, St. Louis, May 9-10.

American Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

Interstate Oil Compact Commission, spring quarterly meeting, Roosevelt Hotel, Jacksonville, Fla., May 9-11.

American Institute of Chemical Engineers, regional meeting, Mayo Hotel, Tulsa, May 9-11.

Liquefied-Petroleum Gas Association, annual convention, Palmer House, Chicago, May 9-11.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

Instrument Society of America, annual spring meeting, Royal York Hotel, Toronto, Canada, May 12-13.

Oil-Heat Institute of America, national oil-heat exposition and annual convention, Boston, Mass., May 16-20.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 23-25.

American Association of Oilwell Drilling Contractors' fourth annual drilling industry safety clinic, May 24-25, Baker Hotel, Dallas.

Society of Automotive Engineers, diesel engines, Engineering Societies Building, New York, May 26.

American Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

Natural Gas and Petroleum Association of Canada, annual meeting, Hotel London, London, Ont., Canada, May 26-27.

Fourth Annual Short Course in Gas Tech-

nology, sponsored by Southern Gas Association, Texas A. & I. College, Kingsville, May 30-June 1.

June

Petroleum Equipment Supplier's Association, annual meeting Broadmoor Hotel, Colorado Springs, Colo., June 5-7.

National Oil Scouts and Land Men's Association, annual meeting, Shamrock Hotel, Houston, June 9-11.

Canadian Gas Association, annual convention, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J., June 17-July 1.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, Pa., June 16-17.

Kentucky Oil & Gas Association, annual meeting, Hotel Lafayette, Hotel Phoenix, Lexington, Ky., June 23-24.

American Society of Mechanical Engineers, semiannual meeting, University of California Extension Building, San Francisco, June 27-30.

August

United Nations Scientific Conference on the Conservation and Utilization of Resources, U. N. Interim Headquarters, Lake Success, N. Y., August 17-September 6.

September

Instrument Society of America, annual meeting and exhibit, Municipal Auditorium, St. Louis, September 12-16.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

American Gas Association, annual convention, Chicago, September 17-20.

American Institute of Chemical Engineers, Mt. Royal Hotel, Montreal, September 18-20.

American Association of Oilwell Drilling Contractors, ninth annual meeting, Baker Hotel, Dallas, September 19-21.

National Butane-Propane Association, Jefferson Hotel, St. Louis, September 19-21.

American Society of Mechanical Engineers, fall meeting, Erie, Pa., September 28-30.

October

American Society of Mechanical Engineers, petroleum division, 1949 Petroleum Mechanical Engineering Conference, Biltmore Hotel, Oklahoma City, October 2-5.

National Lubrication Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

Texas Mid-Continent Oil and Gas Association, annual meeting, Rice Hotel, Houston, October 13-14.

American Gas Association, annual convention, Chicago, October 17-20.

November

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 7-10.

American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York, November 27-December 2.

December

American Institute of Chemical Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., December 4-7.

NOMADS

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

ADVERTISERS IN THIS ISSUE

Aerofin Corporation 145
American Cable Division of American Chain & Cable Co., Inc. ..... Inside Back Cover
American Hoist & Derrick Co. 134
American Iron & Machine Works 86
American Roller Bearing Co. 128
A-1-Bit and Tool Company 79
Armstrong Bros. Tool Co. 116
Aurora Pump Company 134
Baker Oil Tools, Inc. 38
Baldwin-Duckworth ,Division of Chain Belt Company 34
Barium Steel & Forge, Inc. 10
Barret, Inc., William M. 132
Beech Aircraft Corp. 6
Bethlehem Steel Co. 71
Born Engineering Co. 121
Brewster Company, Inc., The 32
British Oilfield Equipment Co., Ltd. 131
Brown Instrument Co., The 12
Bucyrus-Erie Co. 11
Cameron Iron Works, Inc. 127
Carter Company, Ralph B. 125
Charlie's Machine Works 116
Chicago Bridge & Iron Company 49
Cities Service Oil Co. 140
Classified Advertising 148, 149, 150, 151
Colorado Fuel and Iron Corporation, Wickwire Spencer Steel Division 21
Continental Supply Co., The ..... Inside Front Cover
Crose Mfg. Co., Inc., M. J. 113
Darling Valve Mfg. Co. 18
Dean Brothers Pumps, Inc. 140
Dempster Brothers, Inc. 102, 103
Detroit Diesel Engine Division 8
Diamond Alkali Company 26
Dragon Mfg. Co. 132
Dresser Industries, Inc. 118
du Pont 1
Emerol Manufacturing Co., Inc. 137
Fairbanks-Morse & Co. 2
Foster Company, L. B. 144
Foxboro Company, The 14
Franks Mfg. Co. ..... Front Cover
Fulton & Company, R. H. 110
Gaso Pump & Burner Mfg. Co. 80
General American Transportation Corporation 83
General Electric Company 28, 29
Grancell, I. H. 115
Guiberson Corporation 17
Gulf Coast Rent-A-Car-Truck Co. 121
Haering & Co., Inc., D. W. 133
Hewitt Rubber of Buffalo Division, Hewitt-Robins, Incorporated 27
Hughes Tool Co. ..... Back Cover
Hunt Tool Company 31
International Harvester Co. 65
International Nickel Company, Inc., The 36
Jones & Laughlin Steel Corp. 61
Jones & Laughlin Supply Co. 19
Kellogg Co., The M. W. 108
Keuffel & Esser Co. 105
Kinzbach Tool Co., Inc. 145
Koehring Company 22, 23
Kwik-Mix Company, Koehring Subsidiary 23
Lane-Wells Company 20
Larkin Packer Company, Inc. 106
Linde Air Products Co., The 72
Link-Belt Company 5
Macwhyte Co. 3
Manning, Maxwell & Moore, Inc. 105
Mark & Company, Clayton 129
Martin, John H. 132
McCord Corporation 113
McDonald Co., B. F. 136
Mechanical Manufacturing Co., Inc. 116
Metal Goods Corporation 59
Midwestern Engine & Equipment Co., Inc. 112, 139
Minneapolis-Honeywell Regulator Co., Brown Instruments Division 12
Mission Mfg. Co., The 55
Moore Co., W. D. 121
National Airoil Burner Co., The 121
National Aluminate Corp. 51
National Geophysical Company, Inc. 122
Nordstrom Valve Division, Rockwell Manufacturing Co. 15
Oakite Products, Inc., Petroleum Service Division 9
Oil Center Tool Co. 4
Oklahoma Contracting Co. 111
Pelican Well Tool & Supply Co. 130
Penberthy Injector Co. 80
Pennsylvania Flexible Metallic Tubing Company 16
Perrault Brothers, Inc. 111
Petroleum Electric Power Assn. 127
Philco International Corporation 70
Pipeline Cleaners Co. 111
Pittsburgh Industrial Finishes Division, Pittsburgh Plate Glass Company 33
Pittsburgh Lectrodryer Corp. 30
Pittsburgh Steel Company 25
Powers Regulator Co., The 137
Rector Well Equipment Co., Inc. 130
Reed Roller Bit Company 76
Reilly Tar & Chemical Corp. 112
Republic Steel Corporation 64
Roebling's Sons Company, John A. 13
Ross-Martin Co. 136
Ryerson & Son, Inc., Joseph T. 101
Standard Pressed Steel Co. 120
Standco Brake Lining Co. 110
Sterling Machinery Corp. 120
Templeton, Kenly & Co. 115
Thompson-Hayward Chemical Co. 140
Union Carbide & Carbon Corp. 73
Unit Crane & Shovel Corp. 127
United Supply & Manufacturing Co. 7
Universal Oil Products Co. 83
Wallace & Tiernan Products, Inc. 109
War Assets Administration 24
Weil Equipment Mfg. Corp. 130
Wheatley Pump & Valve Mfr., Frank 63
Wickwire Spencer Steel Division of the Colorado Fuel and Iron Corporation 21
Wico Electric Company 143
Williamson, Inc., T. D. 113
Wilson Oil Tools, Web 114

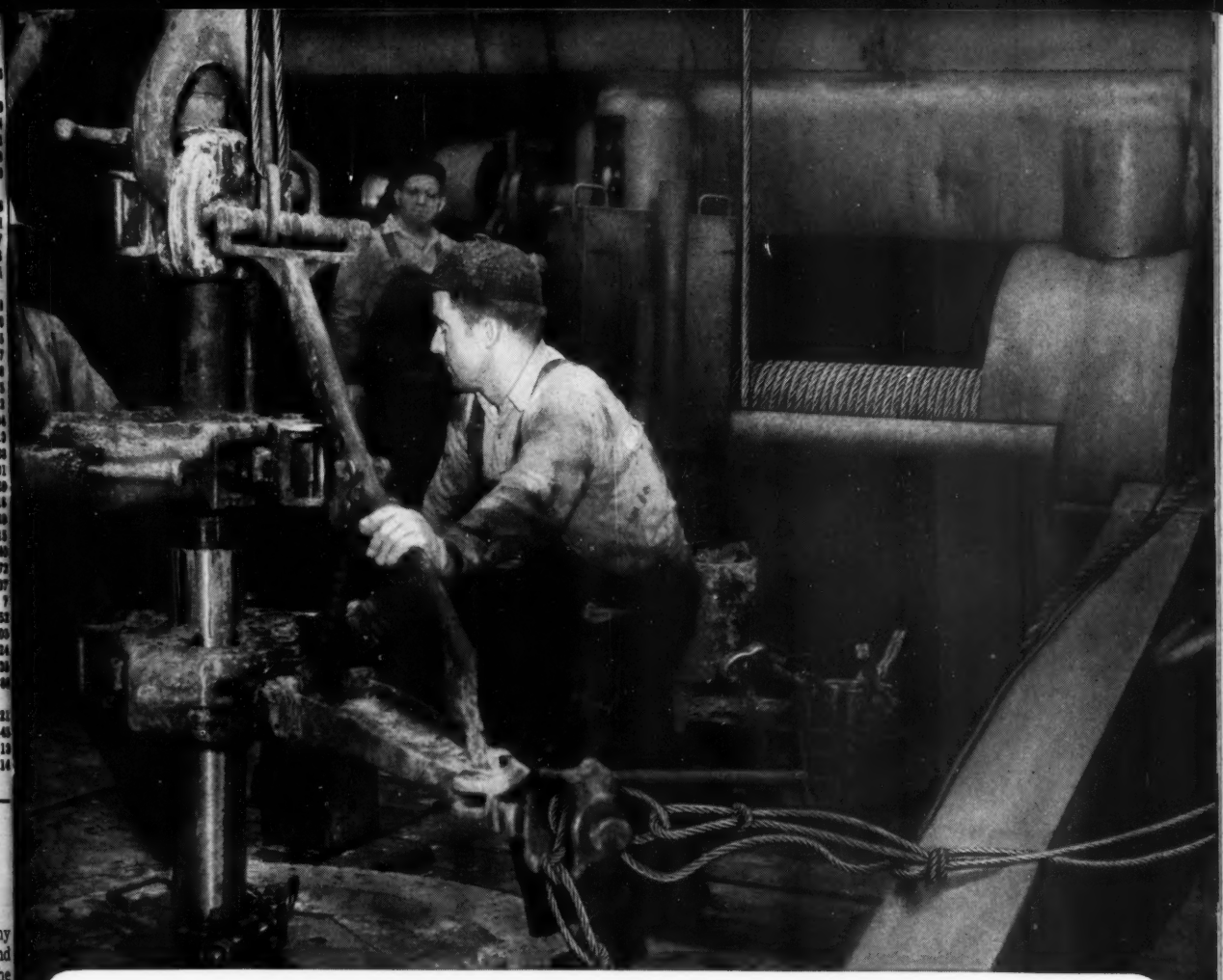
Five Appointed to Study Middle East Oil Prices

WASHINGTON.—One oil company official, one consulting geologist, and three economists will comprise the panel of consultants named by Economic Cooperation Administrator Paul G. Hoffman to investigate and analyze the factors which should be considered in determining competitive prices on shipments of Middle East oil financed by the ECA.

The company official is L. S. Wescoat, president of Pure Oil Co., Chicago, and the geologist is Max W. Ball, former director of the Oil and Gas Division. The other members of the panel are Dr. Edward S. Mason, dean of Harvard University's graduate school of business administration; Atomic Energy Commissioner Sumner Pike, and Dr. George W. Stocking, professor of Economics at Vanderbilt University, Nashville. Pike and Stocking were connected with the petroleum price section of the Office of Price Administration during the war.

The pricing problem arose from the increasing quantity of oil available from the Middle East. Independent domestic producers testifying before congressional committees during hearings on continuation of the European Recovery Program, charged that the prices approved by the ECA for Middle East oil were too high in the light of imports from that area into the United States at what the alleged were "dumping" prices.

TABLE OF CONTENTS ON PAGE 37



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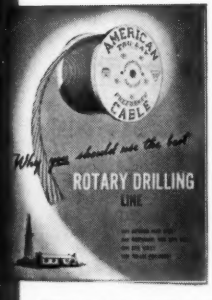

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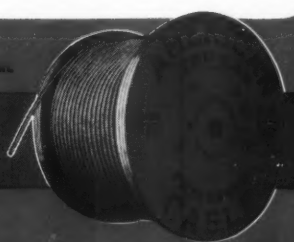

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